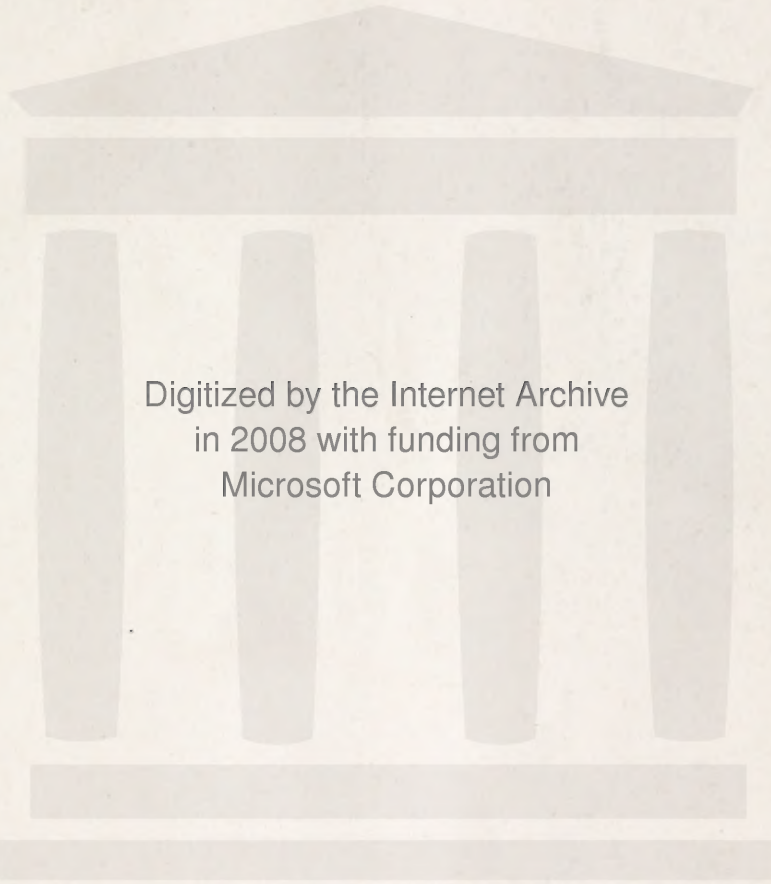


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E. JACOBS,.....Managing Editor

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NOTES AND COMMENTS.

The average price of lead in New York for 1906 was 5.347 cents per lb., as compared with 4.707 cents for 1905.

Construction of the new furnace buildings of steel, at the Granby Company's smelter, Boundary district, is nearly completed.

The Calumet and Hecla on Rapid Creek, Poplar camp, Lardeau, has been bonded and its intended further development announced.

The writer of "What I See Round the City" in the London *Critic* advises purchase of Ymir Gold Mines shares, offering in London at five shillings.

Alaska's production of copper during three years was as follows: In 1904, 2,043,586 lb.; 1905, 4,703,600 lb.; 1906 (estimated), 6,250,000 lb.

The mineral production of Canada in twenty years increased by \$58,353,000. The production of 1886 was valued at \$10,221,000; that of 1905 at \$68,574,000.

For the number of men employed, says the Whitehorse *Star*, the Big Salmon has been one of the best gold-producing districts in the Yukon for the two years last past.

A recent mail brought an order, accompanied by a remittance for one year's subscription for the B. C. MINING RECORD to be mailed monthly to Tomsk, Siberia, Russia.

The total production of coal in the State of Washington, U. S. A., during the last quarter of 1906 was 880,412 tons. This was the highest tonnage of any quarter of the year.

It is stated that the substitution of electric power for steam will result in a considerable saving to the British Columbia Copper and Dominion Copper Companies, Boundary district.

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The total tonnage of ore shipped during 1906 by the silver-gold-quartz mines of the Boundary district is shown by the *Anaconda News* to have been 2,210 tons as compared with 2,887 tons in 1905.

The membership of the American Institute of Mining Engineers on January 1, 1907, numbered 4,048. Included in this total were 11 honorary, 3,858 ordinary, and 179 associate members.

The *Nelson Daily News* states that a piece of ore sent to a local assayer for qualitative analysis was found to be cinnabar ore, the first of the kind known to have been discovered in the Nelson mining division.

The Department of the Interior, Ottawa, has published the "Interim Report of the Commissioner of the Yukon Territory," containing a review of mining operations and general conditions in the Yukon during the 1906 season.

From the *Kootenai* it is learned that a big tonnage of ore is accumulating at the Kootenay Ore Company's sampling works at Kaslo. It is coming from several mines near there, and is awaiting orders from the smelters for shipment.

The removal of 18,000 cu. yd. of rock, states the *Anaconda News*, will be necessary for the completion of the new spur being built by the Canadian Pacific Railway Company to the Dominion Copper Company's Rawhide mine at Phoenix, Boundary district.

Ketchikan and Prince of Wales Island, southeast Alaska, have lately been connected by cable with the outside world. The mining and smelting industries of those places will find the establishment of this means of speedy communication convenient and advantageous.

Included in the estimate of the *Iron Trade Review* of the iron production of the world for 1906 is that of Canada, placed at 575,000 tons. That of the United States is given as 25,300,000 tons. The grand total is 59,700,000 tons gross.

The Daly Reduction Company has been having levels taken and other work done in connection with its intended increase of power for its stamp mill at Hedley, Similkameen. Several schemes are under consideration and the data obtained will enable the management to decide which will be the most advantageous one to carry out.

Governor Hoggatt of Alaska estimates the population of Alaska at 33,000. He places the net increase last year at 3,500 and, in his first annual report, adds that there is a moving population of 6,000 who live in Alaska during the summer months finding employment in mining and various other industries.

Included in the preliminary statistics of production of gold and silver in the United States in 1906 were the following: Alaska, gold value, \$21,249,215; silver quantity, 191,706 fine oz. These figures show an increase in gold over 1905 production of \$6,323,615, and a decrease in silver of 44,872 oz.

A report from Moyie, East Kootenay, is to the effect that the Black-Mackay Mining Company while sinking a sand-pipe about 300 ft. out from the shore of Moyie Lake where the water is some 60 ft. in depth, after driving through 50 ft. of clay and 5 ft. of rock, encountered what is believed to be the extension under the lake of the St. Eugene north vein of silver-lead ore.

The "Summary Report of the Geological Survey Department of Canada for 1906" has been published. Its distribution thus early in the year immediately following that in which the work it records was done is a decided advantage, and we welcome this very desirable change from the delays of past years. We shall notice this report more fully in our next issue.

The second of the large blast furnaces recently erected at the British Columbia Copper Company's smelting works at Greenwood, Boundary district, was blown in on January 24. The treatment capacity of the two new furnaces is 600 to 650 tons each per day. It is hoped that ere long ore and coke supplies will be sufficient to keep all three of the new furnaces regularly in operation.

The article on the "Copper Deposits of Washington, U. S. A.," printed on pp. 28-32 of this number of the *MINING RECORD*, was submitted by the writer, Hon. A. W. McIntyre, to the American Mining Congress, at Denver, Colorado, last October. We acknowledge with thanks the courtesy of the secretary to the Congress in acceding to our request to be supplied with a copy of it for publication.

The following note is from the *London Mining Journal* of January 19: A sharp jump has been made by Ymirs from 2s. to 4s. 6d. A circular from the company states that arrangements have been made whereby the company's indebtedness will be discharged and additional working capital provided by an issue of debentures, of which the subscription of £40,000 has been guaranteed.

James Cronin and others associated with him in this enterprise have acquired the Queen Victoria group of mineral claims situated seven miles west of Nelson, near Beasley siding. The *MINING RECORD* published a description of this property in July, 1902. There is on it a bluff of copper ore from which a large tonnage can be obtained. No work has been done here for years, but now some 25 men are employed.

Recent reports of a proposed amalgamation of the British Columbia Copper Company and the Dominion Copper Company, each owning and operating mines and a smelter in the Boundary district, appear to be without foundation in fact. No mention of such a proposition was made in the circular sent to stockholders notifying them of the intention to hold the annual meeting of the former company on February 13.

It is reported that the Le Roi Mining Company has bought a controlling interest in the Velvet mine, situated on Sophia Mountain, near Rossland, but official confirmation of the report has not been received. During 1904 the Velvet-Portland Mines, Ltd., owning the amalgamated Velvet and Portland properties, erected a small concentrator and shipped about 180 tons of concentrates to the smelter. Since then practically nothing has been done, neither at mines nor mill.

The British Columbia Bureau of Mines has issued two bulletins, both by Herbert Carmichael, provincial assayer. No. 1 is entitled "Mineral Claims on the West Coast and in the Vicinity of Great Central Lake, Vancouver Island," and No. 2 "Mineral Locations, Portland Canal District, in the Skeena Mining Division." The latter is reprinted in this number of the *MINING RECORD*. The illustrations are reproductions of photographs kindly placed at our disposal by Harold Nation who last summer was engaged in survey work in the locality.

S. S. Fowler, consulting engineer; B. A. Isaac, of the Nelson Iron Works, and R. S. Lennie, all residents in Nelson, have been appointed a local board or committee to in a general way conduct affairs at the Ymir mine. It is stated that financial arrangements have been made that provide for the resumption of development work in the mine and production on a scale that should result in operations proving profitable. The late manager, E. M. Hand, is being succeeded by Horace G. Nichols, an experienced mining engineer of good standing who was with the Ymir Company seven or eight years ago.

Speaking to the toast of "The Mining Industry" at Sandon recently, J. M. Harris said that while litigation had undoubtedly given the camp a heavy set-back he hoped the coming summer will see an end to this trouble. If everything goes right he intends putting 30 to 40 men at work at the Reco mine. When called upon to respond, Oscar V. White of the Slocan Star, the owners of which are defendants in the litigation referred to, said that during the past five years Mr. Harris had kept him so busy chasing around "black fissures" that he had had no time to study the mining industry. This apt allusion to a prominent feature in the Star vs. White case caused much laughter, its bearing upon

the dispute between the parties named being understood by all present.

The *London Mining Journal* has given prominence to copper mining in the Boundary district of British Columbia by publishing an article, which is reprinted on another page of the *MINING RECORD*, on the mines and smelter of the Dominion Copper Company. In this connection the following excerpt from the *Boston News Bureau* is of interest: The shares of the Dominion Copper Company are about to be introduced on the London market, a block of 50,000 having been acquired by strong English interests, whose clientele are heavy holders of railway and other Canadian corporation securities. These shares were chiefly contributed by four or five of the largest stockholders of the Dominion Company. The result will be to give the securities of this company a wider and, therefore, a more stable market.

The article entitled "Friendly Messages from 'Uncle Sam' and 'Brother Jonathan'" appearing elsewhere in this number of the *MINING RECORD* has been in type for three months, but has been crowded out of each of several successive issues by matter requiring prompt publication. Though somewhat belated, it is published now for the reasons that it will still serve to indicate how cordial was the welcome given in London to the members of the American Institute of Mining Engineers when the guests of their British friends last summer, and how happy the versatile and genial secretary of the American Institute, Dr. R. W. Raymond, was in his address at the magnificent banquet given, in honour of the visitors, at the Guildhall, London, in the course of which address he delivered "Brother Jonathan's Message."

The total tonnage of Boundary district mines for the first month of 1907 was the smallest for many months. This, says the *Phoenix Pioneer*, was due to lack of coal for steaming purposes which prevented the railways from furnishing a sufficient supply of coke to district smelters. The production figures for January were:

	Tons.
Granby Company's mines.....	34,192
B. C. Copper Company's mines.....	12,230
Dominion Copper Company's mines.....	12,091
Snowshoe	3,830
Emma	759
Providence	150
Skylark	40
Total	63,292

According to the *Los Angeles Mining Review*, the New York stock exchange has taken a "tumble to itself." Only quite recently, as also in former times, its governing board decided that no mining stock could be, or would be, listed. Mining stocks were a bad lot, so wretchedly bad and irredeemable that

they could not be permitted to keep company with industrials and other high-toned stocks, such as were only dealt with on the New York stock exchange. But now its governing board is of a different way of thinking. Its members have reached the conclusion that a respectable mining stock is just as respectable as any other kind of a stock, so they have rescinded their interdict; have decided to no longer taboo mining stocks, rather they will welcome them to their fold. The Granby Consolidated of British Columbia has the honour of being the first to be enrolled on the exchange's list.

In the course of its comments on "British Columbia's Progress" the London *Critic* lately observed: One of the inevitable results of a more stable Government in British Columbia during the past few years has been the marked improvement in the credit of the Province, while, practically without exception, all the industries associated with the country have shown remarkable advances in the same period. The Province's mines, fisheries, forests, farms, and other industries produced commodities in 1906 to the value of \$60,000,000, and when it is recalled that the total number of inhabitants is just about 200,000, such an achievement can with perfect justice be described as remarkable. The output from the mines in 1906 was valued approximately at \$26,000,000, while the flourishing condition of other undertakings is reflected in the Province's revenue figures. In 1901 the income from all sources was only \$1,606,000; for the current year it will be, approximately, \$3,250,000. In 1901 the income from lands and forests was only \$200,000; for 1907 it will total at least \$1,000,000.

Concerning the recent decision of the Chicago holders of a controlling interest in the Providence Mining Company, Ltd., owning the Providence silver-gold quartz mine at Greenwood, Boundary district, to increase the capital of the company, the Greenwood *Ledge* observes: "With the exception of the *Ledge* all the papers in Boundary district have commended the action of the directors of the Providence Mining Company in increasing the capital from \$250,000 to \$2,000,000. Had the company acquired or attempted to acquire more property, or increased their plant, there would possibly have been some excuse for the increased capitalization, but as they have not done so, their object must be an attempt at stock jobbing. The Providence in the past two years has paid a dividend of 10 per cent., or 5 per cent. per annum. This would mean $\frac{5}{8}$ of 1 per cent. per annum on the increased capitalization—not a very high interest-paying investment. But this is not the worst phase of the promotion. If a large amount of Providence stock is sold in eastern cities and no dividends paid on it, the investing public will become suspicious of other and legitimate promotions in the district, and thus a great injury will be done those who are endeavouring to develop their properties on business principles."

The state mineralogist of California, U. S. A., is actively interesting himself in the prosecution of a man against whom the grand jury has found an indictment for obtaining money by false pretences. The accused is under arrest in Chicago and will be taken back to California to answer a charge of having by misrepresentation induced a woman to buy 500 shares of mining stock at \$1 per share. Mr. Aubury, the state mineralogist evidently does not intend to rest content with having secured the enactment of a State law against fraud in company promotion, but will press for its being brought into active operation. Idaho is considering the desirability of passing a law with a similar object in view. If British Columbia would follow suit there would quickly be an end to such questionable promotions as the *MINING RECORD* has from time to time been prompt to expose and condemn. Accommodating "mining engineers" (?), of which unprincipled class there are, fortunately, but few in this Province, would also be restrained from supplying so-called reports to order and thus prostituting what an uninformed public trustingly accepts as their qualifications for expressing an opinion that may be relied on. It may not be brought about at once, but eventually the pressure of public opinion will compel legislation in this country that will make the trickery of such parasites on the mining industry a criminal offence and will provide accordingly for their punishment.

The "Fourth Annual Holiday Number" of the *Pioneer*, published at Phoenix, Boundary district, is the best and most useful publication dealing with the important mining and smelting industries of the district from which has been obtained during several recent years the greater part of the copper produced in Canada, that has come under our notice. Freely illustrated descriptions of mining camps, individual mines, smelters, electric power systems, railways, etc., together with valuable and instructive statistics relating to the mineral production of the Boundary, fill most of the pages of this special number which contains between 60 and 70 pages. There are nearly 100 half-tones of mine, smelter and other views, representative men, and including line cuts of modern maps of the district and of different sections of it, prepared specially for the *Pioneer*, consequently up to date and giving the leading features of this big mining district. The outlying camps—Franklin, up the north fork of Kettle River; Beaverdell and Carmi, up the west fork of the same stream; and Camp McKinney,—all have attention. Prominence is given, as well, to what are known as the "high-grade" mines of the Boundary, these including a number of silver-gold quartz properties in Greenwood, Phoenix and Beaverdell-Carmi camps. A brief historical account of the district, some information concerning its chief "parliamentary friends," and particulars of several of its towns and

their institutions are also given. Altogether the "Annual" is a publication that is destined to a credit to its enterprising publisher, W. E. WOODS, while the wide distribution of the 6,000 copies printed cannot fail to be of much benefit to the district, especially since much care has been taken to make the information reliable. For all interested, or likely to be, in the mining district producing the larger part of the ore mined in British Columbia, this number will be found worth far more than the 25 cents price at which it is published.

DOMINION COPPER COMPANY

ALLENTION is recently being directed to influential quarters to the prospects of the Dominion Copper Company, a limited liability company, incorporated under the laws of British Columbia, in a colony remarkable for its great mineral wealth—and inquiries having been made as to the position and character of the undertaking, the following details, based on official statements, will doubtless be of interest to our readers.

The kernel of the position of the company, which is registered under the laws of British Columbia, is its possession of properties containing large deposits of low grade copper ore that are being worked at an ample margin of profit, and furthermore, the strength of its financial position, the \$750,000 remaining in the coffers of the company enabling the necessary provision to be made for the progressive increase and improvement of the plant which is essential to cope with an expanding scale of operations, without trenching upon profits available for dividends.

The present and prospective growth of the company's operations forms the most striking feature of the concern. Until recently the plant had a capacity of 650 tons per day, and the net earnings for the month of November last were \$30,000 upon this basis. As a result of arrangements made for increasing the output, the blowing-in of an additional furnace early in the present month will increase the capacity to 1,500 tons a day. Taking, however, an average of 1,200 tons of ore treated *per diem*, thus making a liberal allowance for the minor accidents which are certain to occur in the conduct of a big industrial enterprise, the company will produce between 750,000 and 800,000 lb. of copper per month, at a cost carefully calculated at 8 cents per lb. Upon this scale of increased production, and assuming that no further diminution of reduction costs occurs, the net earnings will rise from \$30,000 per month on an average to \$75,000 or \$80,000, sufficient to pay 14 per cent. upon the par value of the stock, and a substantially higher percentage upon the present price of the shares. With copper reckoned at its present price the return would be still higher. Speaking of the recently-added furnace, M. M. Johnson, the company's consulting engineer, said: "This new furnace will give us an additional capacity of from 700 to 900 tons per day, or a total capacity, with the furnaces now running of from 1,300 to 1,500 tons daily. The new furnace will be mechanically fed, eliminating hand labour almost entirely. As soon as practicable, the mechanical feed will be applied to the furnaces now in use also." The operations of the company, however, are projected upon a far broader scale than this, and plans are being prepared and estimates being made for the increase of the plant to a capacity of 25,000 tons of ore daily. With the plant at this scale of ore daily the Dominion Copper Company would be in a position to produce 25,000,000 lb. of copper per annum. On 18-cent copper this production would

A few weeks ago the *Vernon News* published some notes concerning the British Empire mine (the manager and financier of which is the notorious "Windy" Young) the opening sentence of which was as follows: "Professor Van Denbroch, a New York mining engineer of continental reputation, has been spending a few days in the district, the object of his visit being to inspect the British Empire mine, opposite Okanagan Landing, in the interest of eastern stockholders." This announcement was reprinted in the *Victoria Week*, the present editor of which several years ago was engaged by "Windy" Young to report on alleged coal lands in the Similkameen for that fake company promoter's use in the furtherance of his schemes, which ended in loss to most of those who retained their stock holdings in the company he then floated. Doubting that any "mining engineer of continental reputation" would be sent to examine mining property that "Windy" Young was in charge of, the editor of the *MINING RECORD* made enquiries, first from a well-known member of the United States Geological Survey whose professional duties necessitate his travelling much in the most important mining regions from Mexico to British Columbia, and next from the editor of one of the leading mining journals of the United States, with this result: Neither of the gentlemen mentioned remembered ever having previously heard or seen the name of "Professor Van Denbroch," who, by the way, is not a member of either the American Institute of Mining Engineers or the Institution of Mining and Metallurgy. Now the *MINING RECORD* is not asserting that there is no such person as Professor Van Denbroch or that if he exist he is not a mining engineer of good repute and ability. It is, though, endeavouring to show that no engineer of that name is of "continental reputation," and that in so describing him the *Vernon News* and the *Victoria Week* published a statement that is false and consequently misleading. After the *Vernon News* shall have become fully informed as to the crooked ways of "Windy" Young in his earlier mining company promotions it will not be so easily deceived by him as it appears to have been in the past. The British Empire mine may be a good property—the *MINING RECORD* has not suggested the contrary—but the association with it of the name of "Windy" Young in any responsible capacity is enough to make those who wish to see mining freed from fraud suspicious of it during the period of his connection with it.

give the company net earnings of \$2,500,000, or 50 per cent. on the par value of the stock—\$5 per share. These are big figures, and point to the expansion of the concern upon lines of great magnitude; but it is pointed out that they are carefully calculated from data composed of the present product of the company combined with the known ore content of the mines and the designed capacity of the additional plant. Already the smelter and mines are equipped with the most modern plant, driven by hydro-electrical power, which has resulted in reduced costs.

The properties of the company are situated in British Columbia, Canada, and cover an area of 360 acres. They adjoin the property of the Granby mines, whose ore values are the same as those of the Dominion Copper Company, and who have a smelter capacity at the present time of 2,700 tons per day, while their net earnings were over \$1,850,000.

The company's chief mines are the Brooklyn, the Idaho, and the Rawhide. The Brooklyn has been the principal producer to date, averaging 500 tons of ore per day. There are calculated to be 450,000 tons of ore in sight above the 400-ft. level. The average values in this mine are returned at: Copper, 1.43 per cent.; gold, \$1.32; silver, 25 cents. The Idaho mine is a most important asset, and is confidently expected shortly to produce a large tonnage daily. Cross-cuts show ore bodies similar to those in the Granby's mines, which adjoin this property, and from which 2,000 tons per day are being mined. The Idaho claim is 1,500 ft. square.

Describing the situation at the chief mines, Mr. Johnson recently said: "The Rawhide mine is looking well. We have pushed development work on this property during the past few months, and the surface work is very satisfactory. We are getting a splendid tonnage of ore there, and the four tunnels are opened up all in solid ore. We expect to take about 100 tons a day from the Rawhide when the new furnace is blown in. We are getting the most of our ore at present from the Brooklyn. The Idaho and Stem-winder claims are being rapidly developed. We are taking about 50 tons a day from the Idaho, and the shipments from this property will be gradually increased.

"Important developments have taken place at the Sunset group, which includes the Sunset, C. O. D., Florence Fraction, and Crown Silver claims. The ores from this group run heavy in iron, and have been used only as a flux, but during the past 60 days the copper content in these ores has increased, and it is now running between 1.14 and 1.25 per cent. copper. There are good indications that these ores will show increased copper values at depth. At the Athelstan mine the shaft is being unwatered. This shaft is down to a depth of 250 ft. We will start cross-cutting at the 200-ft. level in order to develop some good backs of ore."

With the present figures of production and profit dividends are considered to be well within sight, and while the management of the concern is officially silent on the subject, a well-known Boston paper re-

produces a statement to the effect that the directors have decided, barring accidents, to pay dividends commencing with the second quarter of the current year, at the rate of 10 per cent. on the par value of the stock.

PROSPECTIVE EARNINGS OF GRANBY CONSOLIDATED M., S. AND P. CO.

GEORGE L. WALKER, in his weekly copper letter to the *Boston Commercial*, says, concerning the Granby Consolidated Mining, Smelting and Power Company:

Granby Consolidated's operations have been curtailed very seriously during the past two months, chiefly because of inability to get a sufficient supply of coke and coal. The miners' strike at the Crow's Nest Pass Coal Company's mines has been settled; but the heavy fall of snow and extremely cold weather in the Northwest have tied up railroad traffic so completely that coal and coke shipped weeks ago have not yet arrived at the mine and smelter.

The Granby Company is now equipped to produce better than 2,500,000 lb. of copper monthly. Its recent output, however, has been only a little more than half this amount, and whereas its net earnings should be approximately \$400,000 monthly with copper selling at 25 cents, they are now running slightly above \$200,000 monthly.

Assuming that the railway freight tangle is cleared between now and February 1, Granby Consolidated should make 30,000,000 lb. of copper this year at a cost of about 8 cents per lb. This will give the company net earnings of \$4,800,000 or \$35 per share on its stock—new capitalization basis—provided the average market price of copper is 24 cents. This is at the rate of more than 25 per cent on the current quotation for its stock, whether it be the new stock, now selling around \$135, or the old, now selling about \$13.50.

Granby stock is cheap at its present price. I do not recall another copper stock at the present moment which has behind it probable earnings during 1907 of 25 per cent on its current selling price. If there are any others, the companies they represent are not making their copper at as low a cost as 8 cents per lb., or have not as great demonstrated value and such future prospects as the Granby. There is every reason for the belief that Granby stock will prove an excellent investment at any price up to \$150 or \$160 per share.

Granby's 35,000 shares have been listed on the New York stock exchange.

During the present winter season Byron N. White will ship in all about 1,000 tons of ore as bulk smelter tests of the value of the ore in shipping quantities. Both the Britannia and Tyee smelters, on Vancouver Island, will receive a proportionate part of this ore, the remainder of which is to be sent to the Tacoma smelter.

THE RICHEST COPPER DISTRICT IN
THE WORLD

A Company Product - Micropresentations Improved.

WORTH \$10,000,000 is a load of copper ore in (on paper) possessing the British Columbia mineral claim; at least so says a crafty promoter of "The British American Copper Mines and Smelter Company," the financial agents of which are J. C. Kenedish, Company of Chicago, Ohio, and Thos. Davies & Company of Chicago, Illinois, according to a half-page advertisement of a prospectus printed in the New York *World*, the *Windsor Free Press*, and other newspapers that do not seem to be particular whether or not their advertising columns are used for the purpose of obtaining money under false pretences, since they sell space for large display advertisements designed to deceive those to whom such appeals are made, usually with the object of obtaining money from them. Well, if people will put money into such wild schemes as that under notice, there is no ordinary means of preventing them, but they are sure to lose it. Yet, though, as Governor Pardee of California said when speaking before the American Mining Congress on the subject of the prevention of mining frauds, "it is quite true that we cannot protect all the fools all the time, but we can protect some of them some of the time," the MINING RECORD offers some observations on the above-mentioned "British-American Copper Mines and Smelter Company," for the benefit of "some of the fools" also others who are not fools but are uninformed as to the facts of the case.

First we will give a little advice to those who contemplate buying stock in this company. It is simply this—don't, unless you shall be prepared to wait a long time for any returns, and even then you must expect to be disappointed eventually, for if you give your money to men who deliberately deceive you to get it, it is not to be expected that they will have any compunction in applying it to purposes other than those you are led to believe it is intended for.

Now, space limitations will not admit of the misstatements made in the prospectus being dealt with *seriatim* so only several that are notoriously misleading will here be noticed, as under

"The richest copper district in the world."

The total value of the copper output of the whole of the adjoining mining divisions of Golden and Windermere for five years, 1901-5, is shown in the "Annual Reports of the Minister of Mines for British Columbia" to have been, at New York yearly average market prices, \$4,179. Of this amount \$1,654 was for 1905. The returns for 1906 have not yet been received by the Bureau of Mines, but they are not expected by the officials to show any increase worth noting. This district is therefore not yet regarded by the provincial department of mines as rich in copper.

"This mine will begin shipping ore at once."

* * * * * All that was passed for the first time.

instance, save only that some ten miles of grading have been done, but not within 50 miles of the mineral claims in question. Nor is there any reasonable probability of construction being shortly proceeded with. No operating railway passes within say 100 miles of these claims by a road or river transportation route.

"The Granby Company, a neighbour of ours,
"is paying 24 per cent. yearly on a capitalization
"of \$15,000,000."

The mines of the Granby Company are situated nearly 200 miles away in an air line. By ordinary transportation routes it would take about three days travel by train and lake steamer to reach the Granby mines from this part of Golden district. Last year they paid 12 per cent, for the first time in their history, being comparatively new mines.

"Managing Director and Engineer in Charge,
"E. August Bradley, E. M., Revelstoke, B. C.,
"mining engineer of international reputation."

There is a man named E. A. Bradley resident at Revelstoke, British Columbia, but this is the first time we have heard it imputed to him that he is of "international reputation," although he may eventually in a discreditable way should "The British-American Copper Mines and Smelter Company" succeed in obtaining an international share subscription list. Mr. Bradley's name is not on the last published list of either the American Institute of Mining Engineers or the Canadian Mining Institute. His professional card is not advertised in any influential mining journal of either the United States or Canada. He says he is "in the money" but we know to the contrary; if so it is particularly unfortunate that he should be associated with J. C. Kernohan, of Cleveland, Ohio, whose name is printed at the foot of the advertisement here noticed and which we believe to contain gross mis-statements, calculated to induce uninformed people to apply for stock which there does not appear any good reason to suppose will bring them any other result than total loss of whatever money they put into this scheme.

ized ore body; much of the ore could be hand-picked for shipment to smelters, but remainder of ore—about two-thirds—would require concentration; present cost of freight to the landing on Columbia River is estimated at about \$12 per ton; the construction of a new road 10 or 11 miles in length is essential; one engineer says "it is impossible to state anything definitely, owing to little development work done, but from all appearance and considering how the ledge occurs in the formation surrounding, I should think there is every indication of permanency of ledge, both in size and value, at depth."

Just a word of caution in conclusion. Mr. Kernohan says in his published prospectus "I have always been particularly impressed with the possibilities of British Columbia and her great copper mines, because of the protection afforded investors by the Canadian Government." Note the words we have italicised and then bear in mind that the British-American Copper Mines and Smelter Company is *not incorporated under the laws of British Columbia*, nor is it registered as an "extra-provincial" company as is usual in the case of *bona fide* companies doing business in the Province. Further, even if it were so incorporated or registered there is no special protection for the victims of mining sharks who either in Canada or any other country sell shares in mining companies, excepting the ordinary laws against obtaining money by false pretences. The British-American Copper Mines and Smelter Company as now promoted might prove a money-maker for its brazen-faced promoters, but for ordinary purchasers of stock it would appear to give promise of proving an irreparable loss.

A DEPARTMENT OF MINES.

VICTOR G. ALDERSON, president of the Colorado School of mines, at the Trans-Mississippi Congress, in session at Kansas City on November 22, spoke on the need of a department of mines and mining, with a cabinet officer at the head of it. Mr. Alderson said in part:

The mining industry is basal. A department would crystallize and bring into harmony all the various influences to upbuild and dignify the industry. Today the miner gets the title to his claim from the land office, more or less untrustworthy. His maps are too late for his use; his information is too old. Prompt advice, assistance, co-operation, is not for him. A department could remedy this state of affairs. In the second place it would revise our mining laws and eliminate much of the legal stupidity in laws made by men who know nothing of the industry. There should be a recognition of mining commensurate with its importance. In the third place it could conduct researches such as are carried on for the benefit of the agricultural industry. Today there is no place where we may turn for information or advice. Such research would open new avenues of prosperity, reveal fresh opportunities for the investment of capital, and provide work for tens of thou-

sands more men. Such a department would secure the enactment of new laws. It is not a work for mere politicians, nor any particular State, but from the standpoint of national development. The duty of the Government is to foster research and to give dignity and standing to the industry.

A hydraulic mining device is thus described in the *Engineering and Mining Journal*, New York, by Charles G. Yale: Pierre Bouery, general manager of the La Grange hydraulic mine near Weaver-ville, Trinity county, California, has devised and put in operation a new style of deflector for handling the giants. It is electrically operated and so arranged that the stream may be accurately directed to any desired point without the pipe-man's being anywhere near the giant itself. The gravel banks at this mine are 200 or 300 ft. high and in order to insure safety to the pipe-man in case of caves, the giants have to be placed at some distance from the banks. In this position the full force of the water cannot be utilized as it feathers or breaks before striking the gravel, and the sprayed water is not as effective as a solid stream would be. With this device of Mr. Bouery's it is possible to set the giant as close as desired to the bank, and yet deflect the stream in any direction. In case of a cave the giant itself may be buried and subsequently dug out, but the man operating it is out of danger. The pipe-man is enabled to stand several hundred feet away from the bank, and by means of electric switches still maintain perfect control over the deflectors on the giant, directing the stream where he pleases. By this means, in utilizing the full force of the water under pressure, much more gravel may be washed with a given quantity of water, than where the stream is allowed to feather too much, and, what is more to the point, there is no danger to be feared by the pipe-man.

British Columbia's representation among the officers and members of the council of the Canadian Mining Institute for the ensuing year will consist of the following: Frederic Keffer, Greenwood, Boundary district, engineer in charge of the British Columbia Copper Company's mines, president; Wm. Fleet Robertson, provincial mineralogist, Victoria, one of the vice-presidents; W. H. Aldridge, managing director of the Consolidated Mining and Smelting Company of Canada, Trail; Thos. Kiddie, metallurgist, Victoria, and Jas. McEvoy, geologist and land commissioner of the Crow's Nest Pass Coal Company, Fernie, southeast Kootenay, members of council. As the secretary—H. Mortimer Lamb—and two members of council—R. W. Brock and J. C. Gwillin—have in past years been intimately associated with mining in British Columbia the Province also has in these gentlemen earnest well-wishers for an enlarged activity and increased prosperity in connection with its mining and smelting industries.

PORTLAND CANAL DISTRICT.

Report of H. Carmichael, Provincial Assayer.

PORTLAND CANAL is the most northerly inlet on the coast of British Columbia, and forms the boundary between that Province and Alaska. This International boundary, the position of which was definitely decided upon some few years ago, has now, in this portion of it at least, been laid out on the ground, and its position clearly marked by monuments or by a cutting through the forests where such occur. The settlement of this boundary has relieved claim owners of much uncertainty as to which country their claims lie in, and should stimu-

late a more active mining. The valley of the river is about a mile wide, composed of gravel and sand, dotted with cottonwood and alder trees. It extends easterly in a straight line, with a gradual rise, for 10 miles, until an elevation of 400 ft. is attained. From this point the river and creeks rise more rapidly, becoming mountain torrents. With very little work a good wagon road could be made up the valley for 10 miles or more. A bridge over the river, near its mouth, is needed, as, without it, it is nearly impossible to cross the river at high water, and all means of communication are cut off.

Communication up Portland Canal is maintained by the Union Steamship Company every week.



View up Portland Canal from Blue Bell Group. Outside's Camp, B.C. (See Alaska Chapter for Map). H. B. C. Photograph.

late development on both sides of the line. The canal, or fiord, communicates with the open sea at Dixon entrance, and from that point runs nearly due north a distance of 55 miles to its head. It possesses few and indifferent anchorages, since the shores on either side are precipitous mountains with, in places, peaks which rise almost perpendicularly to heights of 6,000 ft. About 35 miles from the head of the canal, on the east side, is Maple Bay (marked Maple Point on the chart), a small bay affording good shelter but with rather deep anchorage. The two rivers, the Bear and the Salmon, at the head of Portland Canal, are separated by a high bare ridge of mountain that forms the International boundary line, trending off to the west. On the east side of the valley of Bear River a mountain range extends in an east and west direction, the highest peak of the range, Mount Disraeli,

from Vancouver, and over a ridge to a small stream from Port Simpson. There is a very comfortable hotel at Stewart, at the head of the canal. Attention was first drawn to Portland Canal when, on May 4, 1898, a party of 64 persons from Seattle landed at the head to look for placer diggings at the source of the Nass River. Some 21 of the party went over the divide from Bear River and down the Nass River and struck "colours," but no pay placers. Some of the men still believe that if the "grub" had held out they would have found diggings worth staying with. Two or three of the party wintered on the canal and staked in the spring of 1899 what is now the Roosevelt claim, on Bitter Creek, while Stewart's claim, on American Creek, was staked in 1902, and the principal claims on Glacier Creek in 1905 and 1906.

The country round Glacier Creek is the only part

which so far has been visited and reported on. The locations there have been made on well-defined veins in a schist country rock, carrying values in silver, gold and lead, with a little copper. Farther up Bear River the country rock is said to change, becoming more granitoid, the change being noted on the Mother Lode claim, two and a half miles above Glacier Creek. There is still ample field for further prospecting, and the district is well worthy of attention.

On the west side of the canal the country rock is granite, which continues from the mouth to its head and forms the range referred to as between the Salmon and Bear Rivers.

On the east side a similar granite extends from the mouth nearly to Maple Bay, where the country rock changes to a schist intersected by dykes, which

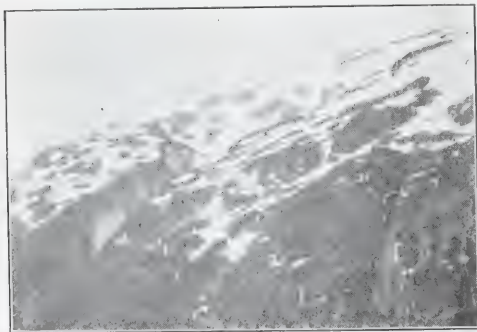
run at an elevation of 75 ft. above the first, and is in on the vein 100 ft.

About 20 ft. still higher up a third, or upper, tunnel, has been run on the vein 40 ft. No stoping has been done, but the different levels have been connected preparatory to stoping, when the ore will be taken out by the lower or main tunnel.

On the surface, above the upper tunnel, the vein has been stripped and shows up strongly, crossing over a shoulder of the mountain. Two or three small diabase dykes were cross-cut in the tunnels, and also show up on the surface; these dykes cross the vein from wall to wall, but do not run into the country rock.

On a level with the upper tunnel, but some 550 ft. to the north, in a small gulch, a cross-cut has been driven through the schist country rock, cutting the vein at 150 ft. in. At this point the vein was found to be about 3 ft. wide and not as heavily mineralized as in the main workings. From the inner end of this cross-cut tunnel a drift has been run to the north, on the vein, for 150 ft., while a drift to the south, towards the main workings, has been run for 220 ft. In this south drift, at 140 ft. from the tunnel, the vein has been replaced by a diabase dyke, but towards the inner end of the drift the vein comes in again with a width of 8 ft., throughout which width it is well mineralized with copper pyrites. The vein has been traced for a considerable distance, both above and below the main workings, and gives promise of carrying a large body of good ore.

Just below the main tunnel is the upper terminal of an aerial tramway which runs 6,000 ft. to the ore bunkers at Maple Bay, where there are good loading facilities. A 6-drill Rand air compressor has been



Location of Eagle Group, Maple Bay, Portland Canal.

formation continues to a point about seven miles up Bear River valley, where granitoid rocks again appear.

MAPLE BAY CAMP.

The properties at Maple Bay are being worked by the Brown Alaska Company, with head office in Seattle and a smelter at Hadley, Prince of Wales Island, Alaska. The general superintendent at Maple Bay is Arthur A. Wakefield.

Outsiders Group. The group consists of 11 claims, including fractions, and lies to the north-east of Maple Bay. A quartz vein has been traced through seven claims running diagonally up the hillside at an angle of 30 to 40 deg. The principal work has been done at the junction of the Regina and Copper King claims. At an elevation of 1,100 ft., and 6,000 ft. back from the bay, a main tunnel has been run in 300 ft. on a well-defined quartz vein, which follows the strike and dip of the schistose country rock, the dip being about 60 deg. to the East. The vein, while clearly defined, swells and contracts in places, varying from 5 to 14 ft. wide, and is well mineralized with copper pyrites, fairly well disseminated, the mass averaging 3 per cent. in copper.

A second tunnel, called the intermediate, has been



Near Maple Bay, Portland Canal, B. C., looking North. (Photograph taken two hours after midnight, June, 1906.)

installed at the beach and a pipe line run to the mine.

A sample of the ore taken as it was being mined gave, upon assay, copper, 3.4 per cent; silver, 0.4 oz. per ton, and gold, 0.05 oz. per ton.

Blue Bell Group.—The Blue Bell group, consisting of eight claims, is situated to the south-east of Maple Bay, the principal work having been done on the Blue Bell. Some 4,500 ft. back from the bay

and at an altitude of 1,500 ft. a tunnel has been run in 50 ft. on a quartz vein from 18 in. to 3 ft. wide, carrying copper pyrites. Some 100 ft. below this tunnel a cross cut is being run to strike the vein, that is now in 185 ft. and is expected to cut the vein at 200 ft. A sample taken of the ore as it could be sorted for shipment gave, upon assay: Copper, 11.3 per cent.; silver, 5.2 oz., and gold, 0.02 oz. per ton.

Eagle Group. The Eagle group of five claims is situated above and to the northeast of Outsiders group. On the Eagle claim surface work has exposed a quartz vein 7 to 12 ft. wide. It has been traced for 1,500 ft., and is well mineralized with copper pyrites. It is intended to develop this vein

erly into the hill. The hanging-wall is schist and the foot-wall pyritic in type.

The ore is marked brecciation, the quartz enclosing and cementing large and small pieces of the schist country rock. The vein is well mineralized throughout, the mineralization, however, varying in places, the prevailing ore being galena with occasional native silver, while at certain points in the vein lead carbonate replaces the galena. A streak of solid, fine-grained pyrites, from 2 to 14 in. wide, occurs with great persistence through the lead. This carries about 0.25 oz. of gold per ton. An assay of a fair sample of the ore gave: Gold, 0.1 oz.; silver, 32 oz. per ton; copper, trace; lead, 27.5 per cent.; zinc, 6.3 per cent. The



Brown, Alaska. Company's Camp and Access to the Mine. (Photograph by J. H. Brown.)

by a tunnel and to ship the ore by tramway to the bunkers at Maple Bay, 3,000 ft. below and horizontally 3,000 ft. distant.

BEAR RIVER CAMP.

Lucky Seven and Little Joe.—These claims are owned by John Griffin and Jos. McGrath. They are reached by following up the main Bear River trail, $2\frac{1}{2}$ miles from the hotel, where a trail strikes up the south-east slope of Glacier Creek, and rising rapidly until the claims are reached at an altitude of 2,450 ft. and about $1\frac{1}{2}$ miles from the Bear River trail. A short distance above the mine cabin a small creek has exposed a quartz vein; this has been developed on the Little Joe by a short tunnel 20 ft. long and a series of shots and open cuts extending through both that claim and the Lucky Seven. The development, while not extensive, shows a well-defined quartz vein averaging about 8 ft. wide, striking N. W. and S. E. and dipping about 20 deg. south-

owners state that average ore assays: Gold, \$4; silver, 35 oz. per ton; lead, 8 to 10 per cent. The vein shows great permanence, having been clearly traced through the Lucky Seven and Little Joe, while extensions have been located at either end of these claims. Another small vein has been located on the claim, but no work has yet been done on it.

Gipsy.—This claim, owned by Beaton and Didsdale, adjoins the Lucky Seven and Little Joe, farther down the hill, but was not visited, as the shaft was reported partly filled with water. The owners state that they have sunk a shaft 40 ft. on a quartz vein from 2 to 5 ft. wide, in schist, mineralized with galena and pyrites, the values running \$50 to \$40 in gold, 20 oz. per ton in silver, and 20 per cent. lead. The owners intend to sink farther in the spring.

Gold and Silver Claims. The mine is located at the headwaters of the south fork of Glacier Creek,

three miles from Bear River. An open cut into the hillside has cut a mineralized zone in the schist, in which stringers of quartz run into and impregnate the country rock. This may be a continuation of the Little Joe vein, or it may be a parallel vein, though it is not so strong nor well-defined, and is not so well mineralized. The width of the mineralization is uncertain, but may be taken as about 8 ft.

Jumbo.—The Jumbo mineral claim, owned by Sam Gurley and R. B. Dodge, is situated at the headwaters of the south fork of Glacier Creek, at an elevation of 2,190 ft., and is distant about $3\frac{1}{2}$ miles from Bear River. On the face of an overhanging bluff 100 ft. high is a mineralized zone in the schist, which here has a strike east and west, with a dip of 22 deg. into the hill. This zone is a quartz impregnation of the schist, there being quite as much schist as quartz. The entire mass is, however, more or less mineralized with lead carbonate and galena, and also carries iron pyrites. Little development has been done beyond a few shots put into the vein, and it is impossible at this stage to say the average values in the ore-body, as it is much decomposed, and it is probable that the greater part of the values have been leached out; but, judging from the results obtained on other claims, there is every reason to expect that it may prove a valuable ore-body. A selected sample of the ore taken for assay gave: Lead, 69.2 per cent.; zinc, 1.5 per cent.; gold, 0.03 oz., and silver, 47.2 oz. to the ton.

Evening Sun. The Evening Sun mineral claim, owned by Rush and Bagges, is reached by a zig-zag trail up the north side of the middle fork of Glacier Creek, and 400 ft. higher than the cabin, which is about three miles from Bear River and 1,950 ft. above sea-level. A vein outcrops on the hillside, in schist country rock, on which a tunnel has been driven 36 ft. The vein dips vertically, strikes N. and S., and is from 3 to 4 ft. wide, with well-defined walls. The vein-matter is largely calcite, fairly well mineralized with galena and a little iron pyrites. A sample of the ore gave, upon assay: Gold, 0.04 oz. per ton; silver, 62.2 oz. per ton; lead, 27.3 per cent.; with a considerable quantity of antimony.

Silver King.—The Silver King mineral claim, owned by A. Nelson, is directly above Rush and Bagges' cabin, the highest workings being at about 500 ft. greater elevation. Several open cuts have been made which show a quartz impregnation of the schist dipping vertically, and outcropping up and down the hill. This carries some blende with a little pyrites and galena. A selected sample of the mineral gave, upon assay: Gold, 0.02 oz.; silver, 43 oz. per ton; zinc, 19 per cent.

Lake View Group. Lake View Nos. 1 and 2 mineral claims are owned by Bebeau and McKay. To reach these claims the main trail up the south side of Glacier Creek is followed for $1\frac{1}{2}$ miles, then Bebeau and McKay's trail turns off to the left and follows up a small creek, a distance of about three-quarters of a mile. The trail rises rapidly at first, but towards the top flattens out considerably. At

an altitude of 2,200 ft. above Bear River a quartz vein outcrops in a small creek. This has been prospected by trenches and open cuts for a distance of 200 ft. These cuts and trenches have been sunk to the vein through 2 ft. of peaty mould and 2 ft. of broken schist. The work has not been sufficient to determine with certainty the nature of the country rock or how the vein occurs, but it appears to be a quartz vein in schist, cutting diagonally across the country rock, and having an average width of about 4 ft. The lead is well mineralized, and carries a considerable quantity of high grade ore in banded formation, the mineralization being fine-grained galena and pyrites. An assay of the best ore gave the following result: Gold, 0.08 oz. per ton; silver, 44.00 oz. per ton; lead, 16 per cent.; zinc, 13.5 per cent.

Mother Lode.—The Mother Lode mineral claim, owned by Jas. McKay, is on a small creek flowing into Bear River from the East, five and a half miles from the north of Bear River. At a quarter of a mile up the side of the hill from Bear River, and 300 ft. above it, is a quartz impregnation in a granitoid rock with a strong quartz vein some 8 in. wide and a number of stringers parallel to it, in all about 4 ft. wide. This shows considerable mineralization, with iron pyrites and a little jamesonite in places. The vein outcrops across the hill N. 10 deg. W., and dips 60 deg. to the East. Assays of ore gave: Gold, 0.05 oz. per ton; silver, 4.2 oz. per ton.

American Girl Group.—The American Girl group, owned by G. Stewart, is situated on American Creek, some 15 or 20 miles from salt water, following up Bear River. This claim was not visited owing to high water in American Creek, making the crossing dangerous. According to general report, there is on these claims a very considerable showing of galena or jamesonite, carrying, in places, high values in silver.

In addition to the claims already mentioned, there are, in the district, a large number of claims which it was impossible, under the circumstances, to visit, on the most of which comparatively little development work has been done. The owners of a number of these claims supplied the writer with samples of ore from their respective claims, which samples were assayed at the Government Laboratory, Victoria, and the results are given as follows, in order to indicate further the class of ore so far encountered in the district, without assuming responsibility except for the assays:—

Black Knight.—The Black Knight mineral claim is situated on the east side of Portland Canal, comparatively near the water. The sample received appeared to be nearly solid galena and zinc blende, with little gangue matter, and contained: Lead, 43.0 per cent.; zinc, 28.0 per cent.; silver, 16.4 oz. per ton.

Silver Bow.—The Silver Bow claim, owned by G. Starke and M. K. Rodgers, is situated about three miles up Glacier Creek from its junction with Bear River, and at an altitude of over 3,000 ft. The

sample assayed consisted of mixed sulphides of lead, antimony and zinc, containing: lead, 17.1 per cent.; zinc, 8.0 per cent.; antimony, about 20 per cent.; silver, 8.2 oz. per ton; gold, 0.04 oz. per ton.

Roosevelt. The Roosevelt mineral claim is on Bitter Creek, a tributary of Bear River, about 41 miles from Portland Canal, and is owned by F. Rainey, of Stewart, British Columbia. The sample received assayed: Lead, 24.7 per cent.; copper, 1.5 per cent.; silver, 20.0 oz. per ton; gold, 0.02 oz. per ton.

Franklin No. 1.—The Franklin No. 1 mineral claim, also owned by F. Rainey, is located on the west side of Bear River. The samples received assayed: Copper, 6.2 per cent.; nickel, none; silver, 2.2 oz. per ton; gold, 0.02 oz. per ton.



Looking southwest from Mt. Queen, Mountains of Alaska. In distance, across Portland Canal.

KEMANO RIVER.

The Kemano River flows into Gardner Canal on the northeast side, 30 miles from the mouth of the canal. It is a stream of considerable size and is navigable for canoes a distance of 20 miles, but is so swift flowing as to require "poling" or "lining" all the way. At the mouth of the river there is a good harbour, with anchorage in not too deep water. The mountains, which rise abruptly to a height of 4,000 or 5,000 ft., seem to be entirely granitic and show very marked glaciation to a height of 2,000 ft. or more. At eight miles from the mouth of the river,

Pintledanne Creek flows in from the north. From this creek there is a good trail, with an easy grade, to Tatsa Lake, which in turn flows into Ootsa Lake. The height of the pass seems to be 3,000 ft. and the distance from Gardner Canal to Tatsa Lake, 20 miles. This pass seems to afford an easy route to the Ootsa Lake country.

Pintledanne Group.—The Pintledanne group of mineral claims was staked in the spring of 1906 by Dakin & Pocklington, of Victoria, British Columbia. The claims are reached from the north side of Gardner Canal by following up the Kemano River to the mouth of Pintledanne Creek, a tributary flowing in from the North. There is an old Indian trail following up this creek and over the summit to Tatsa Lake, in the interior. This follows the north bank of the creek up for a distance of about 2½ miles, when it crosses the creek to the south side and rapidly ascends the mountain, reaching, at an altitude of a little over 2,000 ft., the claims in question.

Pintledanne Creek runs through high granitic mountains, which rise on either side to an altitude of 4,000 ft. On the mountain on the left side of the creek, two miles from its junction with the Kemano River, is a large and well-defined quartz vein. This is easily seen where the vein crosses the gulches which run down the mountain side. The vein has an approximate width of 100 ft. and crosses diagonally in a northwesterly direction over the range, a distance of several thousand feet. On this vein the Pintledanne group of claims has been staked. The vein was examined where it crossed the two gulches at an altitude of 2,000 ft. above the Kemano River, and at a distance from it of about two miles. The vein is well and strongly defined, with a frozen contact with granite on the lower side and diabase on the upper side. The diabase dyke is of a later date than either the vein or the granite. The vein-matter is rather sparsely mineralized with copper pyrites, bornite and molybdenite unevenly disseminated through the mass, and it is doubtful, with the present showing on the property, whether it would pay to work. The ore, however, appears to be well suited for concentration, there is ample water power to operate a mill and the transportation problem could also be easily solved. Careful prospecting might disclose pay shoots in the vein which would materially help the property.

Intended changes in the "mining machinery" item in the free list are announced as follows: (1) Will become dutiable—Coal-washing machinery, charcoal-making machinery, coke-making machinery, ore-drying machinery, ore-roasting machinery, ball and rock machinery, emery-grinding machinery, jigs, blast furnaces, water jackets, monitors, and giants, all of which can be now made in Canada. (2) Added to the free list are: Parts of mining water lamps and accessories for cleaning, filling, and testing such lamps; blast furnaces for the smelting of copper and nickel; and integral parts of machinery specified in the item.

FRANKLIN CAMP, BOUNDARY DISTRICT.

By R. W. Brock.*

FRANKLIN CAMP is situated on the east branch of the north fork of the Kettle River about 43 miles by road from Grand Forks. At present it can be reached by stage from the railway at Grand Forks in a day. Hotel accommodation and supplies are to be had in the camp.

Recently the camp has attracted some attention as a result of the development work now in progress, and the promise of a railway now under construction from Grand Forks.

A reconnaissance survey of this part of the country was made by the writer and W. W. Leach of this Survey in 1900 and the topographical features and salient points in the geology are shown on the West Kootenay map sheets, issued some time ago.

In the day's visit to the camp this summer nothing could be done toward correcting the outlines of the geological formations as given on the map. When the survey was made the country was timbered and the position of the geological boundaries had usually to be assumed. Since then fires have swept over the camp and the rocks and ledges are much better exposed.

The geology of the camp is somewhat complex. The oldest series of rocks represented consists of limestone usually much metamorphosed to crystalline limestone, to green lime silicate hornfels, to a baked-like silicious rock, highly fractured, and to breccia or conglomerate-like rocks, some with limestone surrounded by green silicate and some with green silicate nodules in a limestone ground mass; of argillites and of greenstone. The altered limestone is much more extensive than represented on the map. A large area consists of grey Nelson granodiorite which is intrusive in the basal rocks. Both these formations are intruded by a gabbro-like rock and a porphyritic syenite with long coarse reddish feldspar crystals. All the above rocks are cut by a light acid granite (Valhalla granite) toward the west fork divide and by pink alkali syenite (Rossland alkali syenite) to the east. Numerous dykes from these intrusives cut the older formations. Overlying the older formations like a mantle are Tertiary rocks, shaly, coarse in island parcels but which formerly stood as a continuous capping. These rocks consist of a quartzite-like rock, gritty tuffs with pebbles, conglomerate beds, and conglomerate beds with interstratified ash rocks. Overlying these again are lava-flows consisting of andesites and trachytes and some granites derived from them, basalts and ash beds.

The conglomerates and breccias, from one-half inch to two feet in diameter, of the older rocks, particularly grey granodiorite, limestone, greenstone, and an older fine-grained conglomerate. The con-

glomerate appears to cover a greater area than represented on the map, reaching in places to the north fork bottom. It is cut by dykes of the alkali syenite and by dykes from the volcanic rocks. The lavas have in places a basaltic jointing. Some beds are rich in gas pores in which calcite, agate and zeolites are developed. The abundant intrusive rocks have profoundly altered the older rocks and ore deposits are developed in the latter.

The deposits consist of several types:

(1) Iron and copper sulphides in a gangue of altered country-rock, *i.e.*, green lime silicates, as garnet, epidote, hornblende, quartz, calcite.

(2) Magnetite deposits, with some copper and iron sulphides, and the same gangue minerals.

(3) Galena-blende and chalcopyrite, with only a slight amount of the green silicates.

(4) Quartz veins, with galena-blende, pyrite and chalcopyrite, molybdenite, arsenopyrite, etc.

(5) Chalcopyrite in fractures and replacing minerals of the granodiorite or porphyritic syenite.

Both in the nature of its ore deposits and in its geology this district bears a strong resemblance to the Boundary Creek district. The rocks are very similar and the contact metamorphism, forming lime silicates and magnetic-chalcopyrite deposits, is the same. In Franklin camp, of course, it has yet to be proved that mineralization was on the same gigantic scale as in the Boundary, and that the ores have the minerals in the same proportion to make them so amenable to smelting.

The most extensively developed claim is the McKinley, which has had about \$30,000 expended on it in surface improvements, tunnelling, trenching and diamond drilling. Four leads have been discovered in a band of limestone running north toward Franklin Mountain. Development has scarcely determined the strike of the leads, but they appear to run transversely across the limestone band. Along the ledges the limestone is altered to green silicates, epidote, hornblende, garnet, etc. The lowest ledge yet uncovered has a large development of magnetite, with some iron and copper sulphides.

The second ledge outcrops for a width of about 30 ft., but the dip is at a low angle southwest. It contains a large amount of galena and blende as well as chalcopyrite, the silicates are only sparsely developed, unaltered limestone being in direct contact with galena. It is said to yield high grade ore, with good values in silver. The upper and best developed ledge has iron and copper pyrites as the chief metallic minerals, and a considerable amount of the gangue minerals. It is supposed to be about 40 ft. wide, dipping about 45 deg. south, and has been followed 300 ft. From a point 213 ft. in the tunnel the fourth ledge is cut for a distance of 15 ft. This seems rich in copper. The gold values are low, probably on an average lower than in the Boundary ores, but the copper is expected to run a good deal higher.

The same company that is developing the McKinley is testing the Banner claim on Franklin Mountain, by diamond drilling, etc. This claim was

*From "Summary Report of Geological Survey of Canada" for 1900.

not visited this season. At the time of the last examination there was a strong, very noticeable, quartz, carrying green, black and white.

The Moose Lake claim, on French Mountain, has ledges along the contact of the red lead syenite, with the altered basal rocks. The mineralization is chiefly confined to the syenite. Fractures are filled with seams of chalcopryrite and pyrite, or with green malachite resulting from the alteration of its copper ore, and the constituents of the syenite are selectively replaced by the sulphides. The colored granodiorites are the first to suffer, having the coarsest texture. All spar crystals in a sulphide base, but often the whole rock is replaced by the ore. At several points along the contact, which is drift covered, wide stretches of such mineralized rocks have been uncovered, and in the syenites, a few hundred feet back from the contact, a vein 4 ft. wide of fairly well mineralized rock has been opened.

The Gloucester group, now being worked under lease by the Dominion Copper Company, has not been visited. On the G. H. claim of this group is a ledge of magnetite, with a little pyrite and chalcopryrite. In places it is at least 40 ft. wide, and it has been traced several hundred feet. It seemed to lie wholly in the grey granodiorite. On the Gloucester was a good showing of copper ore, with pyrite, molybdenite, calcite, and quartz, with grey granodiorite on one side at least, but the country-rock is badly altered.

A number of copper lodes occur in the grey granodiorite on Tenderloin Mountain, where the rock is crushed, sometimes to a sort of "ball" structure, round which the granite material wraps. In these crushed zones, particularly along fracture planes, the mineralization is quite heavy.

Deposits had been found in the older rocks of the camp—the altered basal rocks—greenstone and altered limestones, granodiorite, gabbro, porphyritic syenite. Lodes similar to the McKinley are likely to be found in the continuation of the limestone band and in other limestone areas in the camp. But deposits are unlikely to be found in the acid granite (Valhalla granite of the map), the pink alkali syenite (Rossland alkali syenite of the map), or in the capping of Tertiary lavas.

The work done in the camp is limited, and near the surface, so that it has yet to be demonstrated what values the deposits will carry at depth, and for the low grade deposits that they can furnish a large tonnage of pay grade ore. So far the results on the McKinley seem to be encouraging.

Since none of the claims are past the prospect stage, and none of the workings have attained depth, it cannot be definitely stated that another mining camp has been added to the British Columbia list. But the camp has many of the characteristics of a mineral bearing district. Additional discoveries are extremely probable and there seems to be a reasonable prospect that some of the properties may develop into mines.

PETROLEUM IN WESTERN CANADA

MINERAL OIL has been found in the northwestern portion of the Dominion Geological Survey in 1906. The Petroleum industry in Canada is given the of the Canadian petroleum industry. Its importance is increasing.

In western Canada, throughout all the provinces, a great deal of energy is being displayed in prospecting for petroleum. In Manitoba boreholes are being put down at two places at least, where surface indication had been reported, or where signs of the presence of oil were said to have been found on sinking wells for water. One of these places is at Maniton, in southern Manitoba, and the other at Neepawa, on the Minnedosa branch of the Canadian Pacific railway.

Deep boring operations are also being carried on in Saskatchewan and Alberta. The latter province is more especially prominent in this direction. There are at present some 12 or 15 deep-drilling rigs, prospecting various areas between the International boundary in the south and the lower part of Athabaska River in the north.

In southwestern Alberta oil has been struck in two wells at depths slightly exceeding 1,000 ft. It is reported that these wells could be pumped and made to yield; but the lack of means of transportation is a drawback at present. However, prospecting is going on actively, and should the results obtained in this section, which lies southwest of Pincher Creek, justify it, a pipe-line or a railway spur, both of which are feasible, would be constructed.

At Calgary and Medicine Hat drilling rigs are in operation and at the latter place provision has been made to reach a depth of 3,000 ft.

In the northern part of Alberta search for petroleum is being carried on in the vicinity of Fort McMurray, on the Athabaska River, 300 miles north of Edmonton. The extensive outcrops of tar-sands in this region have frequently been referred to by various members of the Geological Survey. These circumstances, however, there is little doubt that where the underground structure and other conditions are favourable large accumulations of oil have gathered, and this far north country may yet become quite a factor in the production of petroleum in Canada.

In British Columbia two companies were working in southeast Kootenay, in 1906. The boring operations were being carried on in the vicinity of oil seepages which were recognized and mentioned by Dr. Selwyn, the late director of the Geological Survey, as early as 1888. The depths reached in this district have not yet been carried down sufficiently far to be conclusive one way or another.

There are also some indications of oil in the district, whence promising indications have been re-

THE KETCHIKAN MINING DISTRICT IN SOUTHEASTERN ALASKA.

Some Particulars of Its Mines and Smelters.

KETCHIKAN MINING DISTRICT is situated in such proximity to the Pacific Coast section of British Columbia as to possess more than passing interest to those connected with the mining and smelting industries of that part of the Province. Among the mine and smelter managers of Prince of Wales Island, which is a part of the Ketchikan district, are several who had previously been associated with similar industries in British Columbia. Further, ore from that district is being shipped in steadily increasing quantities to the Tye Copper Company's smelter at Ladysmith and the Britannia Smelting Company's smelter at Crofton, both on Vancouver Island, British Columbia. Shortly the Alaska Industrial Company will commence shipping ore from its properties to the Tye Copper Company's smelter, beginning with about 1,000 tons a month and probably increasing later in the year to three times that quantity. The Mt. Andrew mine, also on Prince of Wales Island, is now producing about 150 tons per day for shipment to the Britannia Smelting Company's works, which will, if there be no interruption to the carrying out of transportation arrangements, receive from this source between 4,000 and 5,000 tons per month. Several other Ketchikan district mines are expected to also ship ore, though in smaller quantities, to Vancouver Island smelters, which are at length to receive benefit from their long-continued efforts to establish regular smelting business connections with southern Alaskan mines.

Recently the Ketchikan *Mining Journal*, with results decidedly successful and redounding to the credit of its enterprising publisher, printed a special number, freely illustrated and giving much information about Ketchikan (including both town and district of that name), its history, progress, industries, and other particulars of especial interest to large numbers of people, both resident and non-resident. From this special issue, in the preparation of which great pains appear to have been taken, the *MINING RECORD* has pleasure in reprinting the following information, described in the *Mining Journal* as a "Condensed Report of the Mines Near Ketchikan":

Ketchikan, Southeastern Alaska, about 650 miles from Seattle, Washington, in latitude 55 deg. 25 min. North and longitude 131 deg. 18 min. West, is the first port of entry in Alaska after passing through British Columbia and can be reached *via* the inside passage of the great land-locked waterway by swift and commodious passenger steamers either from Vancouver, in British Columbia, or Seattle, in Washington, in from two to three days' sailing amidst diversified scenery, which, for beauty and grandeur, is unsurpassed in any other part of the world.

The town of Ketchikan is the distributing point for the entire Ketchikan mining district which embraces an area of 100 miles square. It has grown in a short space of time from a small fishing station

to a progressive town of about 1,500 inhabitants. From 5,000 to 6,000 people are in its immediate vicinity and in the contiguous towns and mining camps. Ketchikan is equipped with all modern and up-to-date improvements. Excellent hotels, stores and extensive commercial establishments, banking house, daily and weekly newspapers, federal and municipal courts, United States custom house, churches, schools, public library, fraternal orders, hospitals, waterworks, electric lights, steam heat (furnished from a central plant), salmon cannery, cold storage plant, saw and shingle mills, wharves, postoffice, chamber of commerce, a fire department, and all requirements for business and residential purposes. Telegraphic cable connection between Ketchikan and other towns in the district and various other localities in Alaska and the outside world, has been established by the Government and is in active operation. Reduction plants and smelting furnaces have already been erected in the district and are in successful operation, and additional facilities and equipment for handling a large tonnage of ore, the production of which is steadily augmenting, are required and in contemplation.

The early experiences and difficulties which confronted the pioneer miners of this district were similar in many respects to those had and encountered by the Argonauts in some of the now famous mining districts in the far West. Heretofore, unpreparedness to explore and work the mines advantageously, by reason of existing adverse conditions, such as inadequate facilities for transportation and obtaining supplies, irregular and slow communication between the then new mining section and commercial centres, lack of capital, and the many vicissitudes and hardships incidental to a new and almost unknown section of the country, have greatly retarded the development of the mining and other resources of this district. But, after a number of years of persistent effort, hard and patient toil, and enduring and surmounting of many perplexing conditions, results are now being produced which are highly gratifying to the venturesome and intrepid men who had faith in the mineral resources, and great future possibilities of this part of the country, and who had the nerve and courage to back up their judgment and belief in its ultimate successful outcome with their brawn, patience and money.

The Ketchikan mining district has already emerged from a prospective state into one of productive value and stability. Progress, improvement, expansion seem to be the slogan of every one engaged in the exploitation of the mineral and other wealth-producing resources of this part of Alaska, and since the opening up of the mines to a state of profitable production it has become apparent to all true observers of the situation that a great and lucrative industry is now being developed in this region, and which must prove highly important and beneficial, not only to the people of Alaska but in a measure to the whole of the United States in the not distant future. The Ketchikan mining district is now

attracting widespread attention as a gold, silver, copper and marble producing locality and is generally recognized and appreciated as a mining section of great merit. Nearly all of its mining locations are at or close to tide water, affording extraordinarily good facilities for cheap and convenient water transportation at all seasons of the year. The climate is mild, being tempered by the warm Japanese current, which permits mining operations to be prosecuted at all times. The country is densely timbered, and abounds in lakes and magnificent waterfalls issuing

can be produced in this district at low cost. The Ketchikan region therefore bids fair to develop into a mining and smelting centre of great extent, and the time is fast approaching when Alaska and the Ketchikan mining district will become an important factor in the production of the red and precious metals.

Ketchikan mines are now making rapid strides in development, preparatory to entering the ranks of the great producing and dividend paying mines of the country. The district is coming on the front



General View of Hadley, Prince of Wales Island, Southeast Alaska.

from a high elevation, and which are capable of furnishing abundant and continuous power for mining, metallurgical and other purposes.

The coal mines of the State of Washington and the nearby bituminous coal fields in British Columbia now supply this locality at reasonable rates with a satisfactory quality of coal and coke required for mining and smelting operations, and the extensive semi-anthracite coal measures at Controller Bay, near Prince William Sound, and the bituminous coal deposits in the southeastern and other parts of Alaska, have already reached a state of development which insures an ample fuel supply of an excellent grade at lower rates as soon as arrangements can be made for its delivery and shipment. With these and other advantages at hand, the vast extent of the ore bodies of commercial value occurring in the mines of this locality, and the prevailing generally favourable conditions for conducting mining operations on a large scale, it becomes obvious that copper

not by the aid of booming advertising and misrepresentation, but on its merits and resources which are attracting the attention of men of means and experience throughout the country.

The following is a condensed description of the mines, smelters, etc., of the Ketchikan district:—

BROWN LEASES COMPANY

The name of B. D. Brown will always be revered in the Ketchikan mining district, for to him is largely due the credit of the present rapid development of the copper industry. When others lacked confidence in the ore of the Hadley country, Mr. Brown said, "I am going to mine on this property, and I will prove it," and then he proceeded to follow the advice he had given. It required the expenditure of many thousands of dollars to prove that he was right, but his reward is in the Mamie mine and smelter at Hadley and in various other properties of the Brown Alaska Company of which he is the president.

The Mamie Mine—What is known as the Mamie

group of claims was located in the year 1897 and the first development work was done under the direction of George E. Green, now superintendent of the Hadley Consolidated Copper Company. John Hampson is the present superintendent. The mine commenced shipping ore to Hadley, awaiting the erection of the smelter there, in September, 1904, and shipped that year 1,220 tons. During 1905 it shipped 12,600 tons and in 1906 30,000 tons. The mine has 1,200 ft. of workings and almost as much diamond drill prospecting. The ore runs about 3.5 per cent. copper and 0.05 oz. gold to the ton.

The mine is situated on Kasaan Peninsula 5,500 ft. from the Hadley smelter, with which it is connected by an aerial tramway. There is also a horse tramway, 7,700 ft. in length, for transporting supplies. The mine is well equipped with modern machinery and at the camp there are the usual office buildings, assay office, compressor building, blacksmith shop, bunkhouses, ore bins, etc.

The mine is under the general supervision of N. O. Lawton, manager of mines for the Brown Alaska Company, who also has charge of the properties at Maple Bay, Portland Canal, British Columbia, and elsewhere, owned and controlled by this company. He is a capable man and his businesslike methods are beginning to tell in a satisfactory manner, though he did not take charge of the properties till December, 1906.

ALASKA SMELTING AND REFINING COMPANY.

The smelter at Hadley, Alaska, built and operated by the Alaska Smelting and Refining Company of which B. D. Brown is president, was completed and blown in December 5, 1905. The smelter has an initial capacity of 400 tons per day, but erected in a manner to permit of enlargement to 1,500 tons per day and to add converter works for converting into blister copper, the copper matte first made. From the date of blowing in to December 21, 1906, the furnace was in operation during 228 days and smelted 73,000 tons of ore, producing 4,450 tons of matte containing 3,525,000 lb. of copper, 2,600 oz. of gold and 18,600 oz. of silver, of a total gross value, according to present metal prices, of about \$870,000.

The outlook for 1907 for this smelter is encouraging for the mines which furnish the ore are all in good condition and the independent supply from outside properties is steadily increasing. During the past year the smelter made a good showing, yet the coming year gives promise of a large increase in output.

One of the practical men who has made his mark in the Ketchikan mining district is Paul Johnson, M. E., who built the smelter for the Alaska Smelting and Refining Company, and has since operated it, being still in charge. Mr. Johnson was born in Lund, Sweden, in 1857. He attended the university in his native place for a year and was then admitted to the Royal Technical High School and Mining School of Stockholm, and obtained a mining engineer's certificate there in 1881. He was granted a "stipendium" from the Swedish Government and

travelled in Germany to study copper smelting. In 1882 he came to the United States to get practical experience in this line of work, taking employment at the Orford Copper Company's works near New York. After two years' practical work he returned to Sweden. He has since been employed in many copper works in Europe and America, and has had experience in the mines of South America. He has seen much in the way of scientific smelting throughout the world. He possesses the confidence of capitalists and has been able to produce practical results in the broad field of copper production.

HADLEY CONSOLIDATED COPPER COMPANY.

The Hadley Consolidated Copper Company, operating the Stevenstown, Blue Jay and other mines near Hadley, on the east coast of Prince of Wales Island, is a Washington corporation with its home office at Seattle. Samuel I. Silverman is president and general manager of the company, and George E. Green superintendent in charge of the mines.

The property consists of 10 claims, comprising an area of approximately 200 acres, situate on Mount Andrew, about one and one-quarter miles south of Hadley, the headquarters of the Brown Alaska Company. These claims extend from tide-water to an elevation of 1,050 ft. along the slope of the mountain and are reached by rail and aerial tramways from the smelter at Hadley. The property has been developed by tunnels, glory holes, shafts, drifts, cross-cuts and open cuts. This development was begun on June 15, 1905, and on September 16 of the same year the first shipment of ore was made to the Alaska Smelting and Refining Company's smelter at Hadley. For the first two months the daily output amounted to but 50 tons per day, since which time it has been increased to 100 tons. The ore is what is termed self-fluxing, and for that reason is advantageously handled by the smelter company. The average returns from the ore have varied but little during the time since operations began, being about 74 lb. copper, \$1 in gold and 20 cents in silver per ton. The mine had produced up to the end of 1906 in the neighbourhood of 35,000 tons of ore.

The development of the mine from the beginning has been under the immediate supervision of Superintendent George E. Green, who has been Mr. Silverman's representative in Alaska since 1901. Mr. Green is a thorough miner, having followed that business since his boyhood, his field of activity having been in nearly all of the western states and British Columbia. He is a native of the State of Michigan, but the past 20 years of his life have been spent in the mines of the West.

To Mr. Silverman, the president and general manager of this company, the Ketchikan mining district owes a debt of gratitude. About the time he came here in 1900 several so-called experts who had been sent from the East to make reports on the prospects in this country, had given the district a black eye, so to speak. Mr. Silverman was one of the very first to try to prove it a good mining country. He had confidence in the ore, both as to its value and

extent. His attention was first devoted to the properties now being operated by the Alaska Copper Company at Coppermount; then he went into the Hollis district, and afterwards associated himself with B. D. Brown of New York, promoting the three original companies, viz., the Silverman-Alaska, the Brown-Alaska, and the New York Development companies. The then existing conditions for future development in the mines were so promising that they suggested the establishment of a smelter, which was afterwards erected by the Alaska Smelting and Refining Company at Hadley. Mr. Brown was elected president of all the companies. Later Mr. Silverman sold his interests in these companies, at

From the date of the initial shipment to the end of the year in the neighborhood of 60,000 tons of ore were taken from the mine to the Crofton smelter in British Columbia.

W. C. Freeman, who has charge of the development of the property, is considered to be one of the best all round mining men in Alaska, and his work here substantiates the assertion.

ALASKA COPPER COMPANY

This is a Washington corporation owning the Copper Mountain mines and smelting plant at Coppermount, West Coast of Prince of Wales Island. Its chief officers are: President, H. W. Mellen; general superintendent, J. Cuthbert Welch.



Alaska Smelting and Refining Co.'s Smelter, West Coast of Prince of Wales Island, Alaska.

the same time becoming more heavily interested in the Hadley Consolidated Copper Company.

Since the success attained by Mr. Silverman and his associates in the various properties became known capital has been convinced that the Ketchikan mining district is worthy of investigation and each year since the operations began has added to the number of operators.

MOUNT ANDREW MINE

One of the properties added to the list of producers during last season is the Mount Andrew group, adjoining the Stevenstown workings, and lying in the same mineral belt. The ore is a high grade magnetite. The mine is well equipped and an aerial tram carries the ore from the mine to the beach.

The mines are situated on the southern slope of Copper Mountain, which attains an altitude of 3,800 ft. The ore bodies are contact veins between lime and granite. The New York vein carries mainly chrysocolla, the Indiana chalcopryite, the ore running up to 40 per cent. copper with some gold and silver values.

The mines are connected by a system of aerial tramways with the smelter on the bench. The development consists of a series of tunnels.

The smelter was erected in 1904-5 and was blown in for an experimental run in June, 1905. Owing to lack of transportation facilities it has been impossible to operate the plant continuously. Arrangements are now being made to remove this difficulty.

The furnace building is equipped with a blast furnace capable of smelting 275 tons daily, the usual complement of settlers and other appliances. The slag flows from the furnace into a stream of water by which it is granulated and carried down a flume into the bay. The matte is drawn off into pans, broken up and removed to bunkers ready for shipment by water. The ore bins have a capacity of 2,500 tons and the coke bins 1,200 tons.

The sample mill is furnished with the customary elevators, samplers, etc., enabling the absolutely automatic sampling of all ore. The ore from the Copper Mountain mines is delivered to the sample mill bin by an aerial tramway. That received by water is unloaded and hoisted into receiving bunkers of 1,000 tons capacity on the wharf and is then drawn off into cars and hoisted on inclined trams to the mill. The wharf is supplied with the necessary hoisting engines and gear. An immediate improvement is contemplated in the lengthening of the wharf by an additional 300 ft. and the installation of a second hoisting engine and gear.

There are also general offices, sawmill, blacksmith and machine shops, bunkhouses, store and warehouses. A new assay office to be well equipped is in course of erection. Power for the smelting works is derived entirely from water, the present system being under a head of 300 ft.

H. W. Mellen, the president of the Alaska Copper Company, is a man well known all over southeastern Alaska. For the past 12 years he has been prominent in mining affairs. He had charge of the early development of the Jualin mine in Berners Bay, one of the best paying mines in Alaska today. He is a pioneer in the Ketchikan district and the organizer of the company of which he is now president, and during most of the time has been actively engaged in its development and operation.

J. Cuthbert Welch, general superintendent of the company, is a man of ability in his profession. For many years prior to coming to Alaska at the close of 1905, he was in British Columbia, eastern Washington and Montana, where he held important, responsible positions. He is an able smelter man and is confidently expected to make a good record at Coppermount.

CUPRITE COPPER COMPANY.

The Cuprite Copper Company was organized under the laws of the State of Washington in January, 1906; capital stock \$50,000, divided into 50,000 shares at \$1 each. The officers of the company are: President, Ed. LaBounty; secretary and treasurer, Chas. E. Bedford; trustees, Ed. LaBounty, Chas. E. Bedford, and J. T. Jones; engineer and manager, J. T. Jones; superintendent, A. J. Jones. The company's property consists of five claims and a millsite adjoining the Sulzer property on the east coast of Prince of Wales Island and running from the apex of the mountain down to the beach. At the apex the lead discloses 4 ft. of ore that averages net at the smelter \$58. The company is a close corporation and has no stock for sale. Active development

is in progress. In the early spring will be determined the location of the aerial tram and bunkers necessary for shipping the ore to the nearest smelter, which is the Alaska Copper Company's plant at Coppermount, some eight miles distant by water. This property has the ear marks of a mine that will be a fortune maker when placed on a producing basis.

MOONSHINE.

This property is situated on Cholmondeley Sound, on the east side of Prince of Wales Island. Considerable development has been done recently, including a shaft sunk about 50 ft. in ore and a tunnel driven some 70 ft. on the vein at 300 ft. depth. The ore is galena assaying 70 per cent. lead and 70 oz. silver. Work will be vigorously prosecuted on this property.

ALMA MINING COMPANY.

Dolomi, a town with a beautiful harbour, is the home of the Alma Mining Company, which has several groups of valuable mineral locations.

The Valpariso is one of the well known properties of the district. Development consists of a 165-ft. shaft, 400 ft. of drifts, beside several tunnels. A tramway was completed during the past season, one mile in length, connecting the mine with the beach. A 50-h.p. steam boiler, 26-h.p. hoist and a large new sinking pump are at the mine ready for installation.

About a mile from the Valpariso toward the Golden Fleece is the Amazon property, also owned by the Alma Company. Considerable development work has been done on this claim in the past and further drift and shaft work will be done this season.

Another of the company's properties is the Paul, on which 250 ft. of tunnel has been driven. This claim is near the Valpariso with one claim intervening.

The Amazon group consists of 10 and the Valpariso 7 claims. Both groups will be patented this summer.

Shipments have been made from these properties of some rich ore and there is no doubt that large producers will be developed in the very near future.

B. A. Eardley is president and general manager of the Alma Mining Company and he is regarded as a conservative mining man and believes in the full development of the properties in his charge. He is now preparing to obtain patents to the holdings of the company.

EAGLES NEST GROUP.

The Eagles Nest group of claims, located by D. Nicoll in Kasaan Bay, is being developed by the Sea Island Copper Company, a corporation interested through the efforts of Charles Guzman. The work done so far has shown satisfactory results.

OMAR MINING COMPANY.

The Khayyam mines, operated by the Omar Mining Company, are situated at an altitude of about 2,400 ft. above sea level, on the summit and north slope of a ridge 2.8 miles in an air line southwest from Kiam, on McKenzie Inlet. The ore is sent down on an aerial tram one mile long to bunkers and thence transported 2 1-3 miles over a surface

train in cars to bunkers on the beach, where it is loaded on boats and shipped to the smelter. The cars are run in trains of six cars each, one train taking about 15 tons of pyrite ore, which goes about 11 cu. ft. per ton. The trains can transport 300 tons per day of 24 hours.

ALPHA MINING COMPANY.

This company owns what promises to become one of the finest properties in this district. It is located at Dolomi and consists of three claims, the Alpha, Pony and Juniata. There has been a lot of work done and the property is now ready for patent. The Alpha and Juniata are located on the same lode and there is a 5-ft. ledge showing on the surface for approximately 2,500 ft. which carries from \$3 to \$20 in gold, and copper values from 2.5 to 7 per cent. The development work consists of open cuts, a large amount of stripping and a shaft 35 ft. in depth. The outlook is considered promising.

The company consists of Grand Rapids, Michigan, capitalists. They are represented by F. M. Loomis, who came here from that place in February, 1902, and has accomplished a large amount of work in that section of Prince of Wales Island. He also located several other claims, in some of which the stockholders of the Alpha Company are interested. One of these, the Michigan, has much surface work done and a shaft down 25 ft., which is in solid ore with no walls to be seen. The ore carries values in both gold and copper.

There is also the Copper Lake, a claim which adjoins the Golden Fleece, the ore of which it much resembles in character. The values are exclusively in gold. Another claim is the Fortune, of which J. Clark Sproat of Grand Rapids, F. M. Loomis and H. J. Garness of Dolomi, are the owners. There are several ledges on the property which carry galena, grey copper and free gold. Prospecting work done consists of two 30 ft. shafts and a number of open cuts.

CYMRU COPPER COMPANY.

The Cymru Copper Company was organized under the laws of the State of Washington in January, 1906, with a capital stock of \$50,000, divided into shares of the par value of \$1 each. The company purchased three claims on the north arm of Moira Sound, Prince of Wales Island, Alaska, for \$22,500 cash and in addition has located three others. It subsequently expended over \$60,000 in construction and development consisting of wharf, bunkers, 6,000 feet of 36-in. steel railroad, open cuts and drifts, tunnels, etc. Ore has been produced in excess of the first cost of the mine and expenditure for development to date. A 25-h. p. gasoline hoist and a 3-drill air compressor are now installed, by the aid of which the daily product will be brought up to approximately 50 tons per day or 1,500 tons per month.

The property consists of a contact vein running north to southeast with the formation, varying from 4 to 40 ft. in width on the surface, with values ranging from 3.8 to 28 per cent. copper.

The officers of this company are: J. M. Miller,

Jr., president; Frank D. Nash, secretary and treasurer; J. M. Miller, Jr., Frank D. Nash and Frank P. Hicks, trustees; J. T. Jones, engineer; Geo. W. Grayson, superintendent and manager.

The work of development commenced in April, 1906, and the first shipment was made to the smelter on October 11, 1906. The management has every reason to believe that monthly dividends of 25 per cent. will be paid on the output for the ensuing year.

IRVING CONSOLIDATED MINING COMPANY.

The property of the Irving Consolidated Mining Company comprises six claims known as the Goldstream group, located on the southeast shore of Gravena Island, three miles from Ketchikan. The property has been carefully developed at a cost of some \$25,000, and a large body of ore has been uncovered. There are three parallel leads running right through the six claims. The formation is a schistose quartz. The ore bodies are well defined and much of the vein matter has been uncovered by a series of top cross-cuts the full length of the property. There is a small stamp mill on the property, and a full mine equipment. All requisite buildings have been erected, together with a wharf 100 by 40 ft. There is sufficient water for the largest vessels to land at any stage of the tide. The facilities for transportation are good as the property is located at tide water. The Irving Consolidated Mining Company was organized in August, 1906, by J. H. Irving of Seattle, and George Irving and Harry Brice of Ketchikan.

NILBLACK COPPER COMPANY.

The property of the Nilblack Copper Company consists of two groups of claims, Lookout No. 1 and Lookout No. 2, in all 20 claims, located on the east coast of Prince of Wales Island, the farthest south of the working mines. The controlling interest in the company is held by a party of Cleveland and Milwaukee men, who have successfully devoted their time to the operation of iron mines in Michigan. M. P. O'Brien is president and treasurer; Frank P. Richards, vice-president, and S. C. Vessy, secretary.

For the past year most of the work has been confined to the Lookout No. 2 group. The main two-compartment shaft, inclined at 68 deg., is 225 ft. deep. Four levels have been opened; the first at 50 ft., the second at 100 ft., and the third at 150 ft. The bottom level, which was opened during the past year, is at 225 ft. depth. Within a month work will have been started to deepen the shaft to the 300-ft. level. Although the shaft is located but 100 ft. from the high tide line, and the collar 30 ft. above it, very little water is encountered in the mine, a No. 7 Cameron pump easily handling it. So far only what is known as the centre lens has been developed on the fourth level. Cross-cutting is now in progress and should reach both the north and south lenses in a short time. The ore found in the centre lens shows better values in both copper and precious metals than it did on the upper levels.

Neither this nor the south lens outcropped on surface; both were first found on the second level.

The north lens has been worked from the surface down. The outcrop of this body was what first induced work to be done on the property, it showing at high tide line. The power equipment consists of a 30-h. p. hoist; a Rand air compressor, furnishing air for six drills, and the requisite steam boiler plant. A 12,000-ton bunker is erected at the shaft, the ore being trammed from it by endless cable over a trestle 600 ft. to the hold of the ship.

During the past year there were shipped to the smelters at Tacoma and Coppermount, 21,000 tons of ore yielding 1,325,600 lb. of copper, with the usual precious metal values of the district. The company employs an average of 35 men, all work except stoping being as far as possible done by contract, the company furnishing tools and explosives. All the men live at the company's mess, there being no families in camp.

Since only the higher grade ores are shipped to the smelter, it is the intention of the company to ultimately treat the ore on the ground, so that the lower grade ore of the Lookout No. 1 and the low grade ore developed in the No. 2 group can be mined at a profit. However, such an installation will not be made until there is enough of both iron and silicious ores in sight to keep the smelter running continuously for such a time at least that the installation will pay for itself and give a fair profit on the investment. There is a good water power available at all times of the year, so smelting should be done at a comparatively low cost.

VENUS MINE.

The Venus property is located on Prince of Wales Island, near the head of Kasaan Bay and about one and a quarter miles inland from Venus Bay.

The ore body occurring here strikes east and west, dips to the north, and consists mainly of pyrrhotite and chalcopyrite carrying gold and silver in addition to its copper contents.

An open cut was made at the point of discovery and disclosed a smooth, even wall of diabasic rock dipping into the hill at an angle of about 80 deg. from the horizontal.

As the ore body was found to be magnetic a magnetic survey was made and the magnetic contours plotted, thus giving the form and position of the magnetic area.

To verify the survey a short tunnel was run about 140 ft. from the open cut, and after passing through about 6 ft. of soil and boulder clay and 6 ft. of slate, which caps a considerable portion of the ore body, the ore was struck in the tunnel.

Another tunnel farther down the hill has been driven about 90 ft.; 72 ft. of this was soil and boulder clay, then came 6 ft. of quartzite and the last 12 ft. has been partly in quartzite and partly in ore.

From the open cut east the ore body has been stripped for a width of from 4 to 6 ft. for a distance of 50 ft., where it is again capped with country rock.

Ore has been exposed at different points for a distance of 190 ft. and appears to reach a maximum width of about 65 ft.

It seems as if this ore body is the result of a fissure through which rose mineral charged vapors and solutions which in part precipitated their mineral contents in the fissure and also replaced with ore a considerable portion of the enclosing country rock.

It is conveniently situated for working. Continuity with depth being probable, as indicated by its origin, it bids fair to in time become one of the prominent mines of this district. It is owned by U. S. Rush, L. A. Babcock and W. L. Bunard of Kasaan.

RUSH & BROWN MINE.

The Rush & Brown property is situated near the head of Kasaan Bay on Prince of Wales Island.

A 2,000-ton ore bin is located at deep water on Venus Bay. From here a railroad about two and three-quarter miles in length leads to the mine.

Two ore bodies are being worked by shaft at the present time. The larger one has been developed to a depth of about 90 feet, a width of about 35 ft. and a length of about 125 ft. It consists so far as exposed of a body of magnetite impregnated with chalcopyrite, carrying gold and silver in addition to its copper contents. There is some silica, feldspar and considerable calcite disseminated through the magnetite. The ore parts free from the country rock and the walls are practically vertical.

To the north about 160 ft. is the smaller body which dips toward the larger body at an angle of about 65 deg. from the horizontal. The smaller body, which ranges from 9 to 16 ft. in width appears to have been formed by the replacement in part of a diabase dyke with chalcopyrite. The chalcopyrite occurs in the altered dyke rock and also in lenses of various sizes. The largest one thus far encountered was solid chalcopyrite 6 ft. in thickness. The hanging wall shows vertical movement.

In the large ore body cavities were found which showed calcite, silica and sulphides of iron and copper which had been precipitated from solution, and inasmuch as at least part of the ore in the large body is traceable to the same origin as all of that in the small body, and as the large body stands practically vertical while the small body dips toward it at an angle of about 65 deg., it seems probable that the two bodies will unite with depth.

About 10,000 tons of ore have been shipped and a similar quantity is now broken down in the stopes.

The property is owned by U. S. Rush and Geo. E. Brown of Kasaan.

ALASKA METALS MINING COMPANY.

The general manager of this company is Geo. E. Bent. The property is situated two miles from Coppermount, on the west coast of Prince of Wales Island. The ore is a good grade of chalcopyrite with values in gold and silver. The company has equipped the property with a steam plant, compressor and hoist, etc., and is now engaged in sinking a shaft on the ore body. Previous development, from which ore shipped was taken, consisted of tunnels.

RED WING COPPER MINING COMPANY.

This property, operated by E. E. and Tola Wy-

man, is situated seven miles from Copper River on the west coast of Prince of Wales Island. The vein is about 4 ft. wide, consisting of chalcopyrite containing gold, silver and 7 per cent. copper. Development consists of a shaft 123 ft. deep with levels 70 ft. and 130 ft. long. To date the mine has shipped about 3,500 tons of ore. A new hoist is being installed to give power for drills, etc.

OLD HOMESTEAD.

This is owned by Sylvester Bros. of Seattle. It is situated on McLean's Arm. The owners are about to commence systematic development of this property. The ledge is about 60 ft. wide. Assays give gold 0.24 oz. and silver 2 oz. per ton, and copper 3.5 per cent. The intention is to place the property on a shipping basis as soon as possible.

MALLARD MINING COMPANY.

This company is about to commence development of its property on McLean's Arm on the east side of Prince of Wales Island. The ledge is 20 ft. wide carrying chalcopyrite. Assays yield gold 0.14 oz. and silver 5 oz. per ton, and copper 10 per cent. The property has a good outlook for developing into a mine of considerable importance.

TONGASS COPPER COMPANY.

Encouraging reports have just been received from the camps at the Tongass Copper Company's property on Thorn Arm, where prospecting has been going on for some time, and with satisfactory results.

The ore body encountered some time ago has been found large and of sufficiently high grade to warrant more extensive development work. The property is a copper and silver proposition with fair values in gold. Superintendent Waters recently returned from Seattle prepared to open the mine for shipping. The Tongass Copper Company is a Washington corporation with main office in Seattle. A number of the officers in the Hydah Copper Company figure prominently also in the Tongass.

NORTHWESTERN MINING AND EXPLORATION COMPANY.

The property under bond to this company from Victor Vigelius is proving satisfactory. This property is about four miles from water transportation, and the company has decided to discontinue work until spring. Before beginning work on the uncovered ore body 50 ft. in width, samples about ran as high as \$56 per ton in gold, silver and copper. Work will be resumed by early spring.

EUREKA GROUP.

The surveying of the tunnel site of the Eureka group of claims at Niblack Anchorage has just been completed. This property is located near the property of the Niblack Copper Company, and it has the same class of ore, being a silicious copper and gold proposition. The ledge outcrops at an elevation of 1,200 ft. and at a distance of 1,000 ft. from the harbour. The owners state that it is practicable to drive a tunnel from the beach to tap the ledge when the character and extent of the ore body in the tunnel shall have been more fully determined. It is intended to develop the property from the lower level.

ALASKA GROUP.

The Copper River of Alaska is the most important source of the best quality of copper in the United States. It is owned by the Alaska Copper Company, which is a Washington corporation. The company is now on the ground doing assessment work. This property has a large deposit of carbonate of iron and iron oxide impregnated with copper sulphide. It is a copper proposition and is easy of access for transportation purposes.

ALASKA INDUSTRIAL COMPANY.

The Alaska Industrial Company, Charles A. Sorenson, general manager, owns several groups of properties near Sulzer on the west coast of Prince of Wales Island. The main development has been done on the Jumbo group, adjoining the properties of the Alaska Copper Company on the north side of Copper Mountain.

Development by tunnel has exposed a large body of chalcopyrite of probably an average value of 8 per cent. copper with some gold and silver. In addition there are large bodies of lower grade ore partially developed. The company last year installed an aerial tramway 8,000 ft. long and erected bunkers and a wharf on the beach. Mining is now in steady progress and the bunkers are being filled with ore preparatory to commencing shipment.

WASHINGTON COPPER COMPANY.

This is a Washington corporation, with its main office in Seattle. Its officers and directors are: President, Fred J. Eitel; vice-president, J. A. Jackson; general manager, Victor Vigelius; secretary, F. W. Cray; treasurer, J. Albert Johnson; with seven directors.

The company is owner of the Mammoth group, located on the north side of Karta Bay, Prince of Wales Island. Development work thereon consists of tunnels, cross-cuts, and shafts, exposing a large tonnage of good grade of copper ore running also about \$2 per ton in gold.

The ore bodies have been traced over four claims in length. The highest altitude of the ledge is 481 ft.; its lowest outcrop discovered up to date is 80 ft. above high water. The claims extend to tide-water. A 3-rail surface gravity tram is now nearing completion; this will convey the ore 2,100 ft. to a deep-water harbour. Wharf, bunkers and suitable loading facilities have been provided and the management is confident of shortly placing the Hydah among the producing mines of the district.

ALASKA GOLD STANDARD MINING COMPANY.

The Alaska Gold Standard Mining Company owns a compact group of 17 mining claims, situated on the west shore of Helm Bay, Cleveland Peninsula, about 25 miles from Ketchikan.

This is one of the oldest properties in the district, having been located in the fall of 1897 by T. F. Johnson, one of the pioneers of Ketchikan, and C. F. Dyer. The property was partly opened up during the next following year and the rich gold ore taken from it at that time was a strong factor in

attracting attention to this mining district and in stimulating the early growth of Ketchikan.

During 1899 a 5-stamp Risdon mill was installed on the property, a substantial boarding house and several other buildings erected, a tramway constructed from the mine to the mill and the property put in good shape for active operations. The mill was successfully operated during the next year, but was closed down in December, 1900, pending further development work on the property. This has been carried on from time to time, and during the winter and spring of 1906 a body of high grade ore was opened up. A selected shipment of this, sent to the smelter at Coppermount brought \$500 per ton, and it was then decided to resume work actively at the mine and to start the mill again.

Last fall the company installed an air compressor and machine drills, also a new steam pump, and it is now actively engaged in sinking a shaft, already down 150 ft., and driving ahead levels from this. It is intended to open up and develop the rich ore body now in sight and then increase the capacity of the power plant and mill, install additional machinery and put the property on a dividend paying basis.

This mine is most advantageously situated for economical operation, being right on the shore of a land-locked, deep-water bay, and the mouth of the shaft is but 225 ft. above sea level, and easily reached by a gentle grade from the shore. Fully 99 per cent. of the values of the ore are in gold, the small balance being in silver.

This mine is still in the hands of the original owners, T. F. Johnson, one of the locators, who has lived almost continuously at the property since it was discovered, being now in charge of the work at the mine, while Thomas Appleton, also interested in the original location, is looking after the business affairs of the company. The president of the company is a well known Seattle attorney, C. L. Parker. The company has its office in Seattle.

ALASKA MARBLE COMPANY.

The Alaska Marble Company, whose property is on Marble Creek, Shakan Bay, West Coast, was first opened up in the season of 1900, but little was done except to prospect and get out samples to ascertain the quality of the product. In January, 1904, the company was organized and work placed on a solid basis. Col. C. E. Nason, a man of large experience in marbles, was put in charge of the work. He had had practical experience in large marble quarries in Vermont for a period of 12 years. He was later in large marble works in Georgia for 10 years. Following this he was in the marble business in Chicago.

In 1904 the colonel took charge of the work on Marble Creek and the following year he built a wharf and a railroad from it to the quarries. The same year he stripped the property, installed machinery, and commenced to get out marble. Up to the present time he has shipped 2,500 tons, most of which has gone to Pacific Coast cities, though some has been sent to Chicago.

The marble stands high in the market, being equal in the best Italian in quality and texture.

Note—The shipment of ore in greater quantity from the Mt. Andrew mine has already been commenced. It is expected that fully 4,500 tons will be received at the Britannia Smelting Company's works at Crofton in February and that thereafter monthly average receipts will for some time be quite as large if not larger. During February also the Alaska Industrial Company will make its first shipment under its agreement with the Tye Copper Company, and the receipts at Ladysmith from this source before the end of that month should total between 2,500 and 3,000 tons.

For the further information of readers of this journal interested in particulars of Ketchikan district mines it is here stated that the following articles, published in the *MINING RECORD* in 1906, also contain particulars of some of these mines: "Present Conditions Southern Alaskan Mining Development," in February number, pp. 51-9; "Ketchikan, Alaska," in August number, pp. 303-5; "Ketchikan, Southeast Alaska," in September number, pp. 365-6.—Editor *MINING RECORD*.

Tinstone has at last been discovered in a solid vein in Canada. Samples were received last month by the Geological Survey of Canada from the curator of the provincial museum at Halifax, and they proved on being assayed to be cassiterite, the most valuable of tin ores, containing 78 per cent tin and 22 per cent oxygen. The discovery was made at Lake Ramsay, three miles west of New Ross, Lunenburg county, Nova Scotia. The ore is found in semi-crystalline form disseminated through a vein of decomposed, kaolinized pegmatite in granite. In the reports of the Geological Survey tin ore is reported to have been found in drift at several places in Canada. It was found in New Brunswick on the Pokioik River, York county; in Quebec in Compton county, and in the gneiss of Buckingham, Labelle county; in Ontario in minute quantity at Sudbury, and the Vermillion mine, in the county of Denison, district of Algoma; in British Columbia in a 3-ft. vein of pegmatite cutting granite near Osoyoos Lake, also in Cariboo and Boundary districts; and in the Yukon in several tributaries of the Klondike River, but so far, most frequently in Bonanza, Hunker and Sulphur Creeks, where it occurs as stream tin in smooth rounded pebbles up to 2 in. in diameter, which remain with the gold in the sluice boxes, on account of their weight.

United States mint officials have compiled figures showing that the world's production of gold for 1905 was valued at \$379,289,200, an increase of practically \$20,000,000 over the figures for 1904. Africa held first rank, the production being valued at \$113,329,110; while the United States was second, with \$88,180,700; and Australia third, with \$85,926,500. It is estimated that the production for 1906 will reach a value of \$400,000,000.

CONDITION OF THE MINING INDUSTRY IN CANADA IN 1906.

Review by the Director of the Geological Survey.

CANADA'S MINING INDUSTRY appears to be in a flourishing condition. Particulars of production throughout the Dominion in 1906 so far available indicate that there was in that year a substantial increase as compared with 1905, the advance having been in quantity as well as value of the mineral output. A recently issued Press Bulletin of the Geological Survey of Canada thus deals with the mining industry of Canada in 1906:

The director of the Geological Survey has introduced into his "Summary Report for 1906" a new feature which will appeal to all those interested in the mining industry of this country. In a few words he sums up the principal items of the mineral production and shows that the mining industry has never before been in so healthy a condition. He writes:

It can be said without fear of exaggeration that the condition of the mining industry in Canada in 1906 has been one of large prosperity; and it has, in fact, achieved greater progress and given bigger returns than during any previous year on record. In the year 1905 the total mineral output reached almost \$70,000,000, as compared with but a little over \$60,000,000 in 1904. While actual figures of production are not yet available for 1906, the activity evidenced in both the metalliferous and non-metalliferous mining will, no doubt, result in another large increase being shown. There has been during the year an active demand for nearly all mining products, and the higher prices realized, especially for the metals and their ores, have not only helped to increase the actual output, but have stimulated development and prospecting throughout the country.

Metallic.—The increase in prices of metals during 1906 is distinctly shown by the following quotations. The average price of metals for 1905 was as follows: Silver, 60.35 cents per oz.; copper, 15.59 cents per lb.; lead, 4.7 cents per lb.; spelter, 5.82 cents per lb.; nickel, 40 cents per lb. During 1906 the prices of all these metals had increased, and in December, 1906, the quotations were as follows: Silver, over 70 cents per oz.; copper, over 22 cents per lb.; lead, 5.75 cents per lb.; spelter, 6.4 cents per lb.; and nickel from 45 to 50 cents per lb.

Nickel.—The nickel-copper mines at Sudbury have been actively worked throughout the year and will show an increased output. Electric power has been introduced and the general efficiency of the works greatly improved.

Copper.—The actual output of copper in eastern Canada, outside of the metal obtained from the nickel ores above mentioned, is comparatively small, but a great deal of work has been done during the year in the exploration and development of copper properties.

British Columbia is now Canada's great copper-producing province and more particularly the great

bodies of low-grade, but easily-mined, ores of the Boundary district. The shipments from this district during ten months of 1906 are estimated at close on a million tons or greater than the total output of 1905. The smelting capacity of three furnaces in the district was considerably increased during the year. Dividends were declared by one company aggregating \$1,215,000.

The copper mines of the Coast district in this province have been actively worked during the year, as were also the ores of the Rossland district, which are further mentioned below.

Gold.—The gold output in Canada has been showing a yearly decrease since 1900 due to a regular falling off in the Yukon placer production, and this decrease has, in all probability, continued in 1906. In eastern Canada the output has never been large, but Nova Scotia seems to have made a better showing in 1906 than in the immediately preceding years. In British Columbia the gold production has shown a slow but steady increase which has to some extent counter-balanced the decrease in the Yukon output. In Rossland an important amalgamation of interests took place in the early part of the year. The War Eagle and Centre Star mines, the smelting works of Trail, with the St. Eugene silver-lead mine of East Kootenay, and other interests, were united under one management known as the Consolidated Mining and Smelting Company of Canada. The consolidation is one which will, no doubt, tend to much greater stability in the mining industry.

The discovery of new ore shoots in the Centre Star and other mines, the payment of dividends by the Le Roi, the Le Roi No. 2, and the Consolidated Mining and Smelting Company, and the encouraging detailed geological work done by the Geological Survey under R. W. Brock, have all tended to put new life into the district and a bright future is looked forward to. The total ore shipments for 1906 may possibly not exceed or even equal those of 1905 owing to the unfortunate strike of coal miners at Fernie having caused the smelters to close down for some months in the latter part of the year for want of coke.

In Cariboo several properties, including that of the celebrated Consolidated Cariboo Hydraulic Mining Company, were acquired by the Guggenheim Exploration Company, and a large investment of capital is being made in the construction of many miles of new ditches, which will provide for a more regular and larger supply of water for the working of the huge areas of gold-bearing gravels this company possesses.

The Athabasca country is also not so usual, although a shortage of water had to be contended with.

The gold output of the Yukon will again apparently show a decrease. Official figures are not yet available for this current season, but are more than \$6,000,000 is to be expected this year. In this district the large corporations are absorbing the smaller operators and the Guggenheim Exploration Company, under the name of the Yukon Consolidated

Gold Fields Company, has entered the field, buying up numerous claims. The company has already commenced the construction of ditches and flumes to provide water for operating its claims. Other large works are to be undertaken, such as the construction of reservoirs, a power plant, etc., and altogether a large number of men will be employed this winter.

Iron.—The iron industry has been active throughout the year, a good demand for all classes of iron products having been experienced and the iron furnaces have been operated probably more extensively than ever before. A new furnace plant is in course of erection at Port Arthur intended to utilize the ores of the Atikokan areas. The output of pig is likely to be larger than in 1905, and would probably have been still greater but for an unfortunate dispute between the Dominion Iron and Steel Company and the Dominion Coal Company in November regarding their coal contract.

Lead and Silver.—The argentiferous galenas of the Kootenay districts are again being worked on a large scale, the East Kootenay mines, St. Eugene and others being large shippers during 1906.

The Cobalt district of Ontario has attracted world-wide attention during the year and is rapidly becoming an important silver-producing district.

Zinc.—The concentrating of zinc ores in British Columbia has continued with considerable success. The large zinc smelter at Frank, Alberta, was sufficiently advanced for the first metal to be turned out in June. It is understood, however, that some further changes and improvements were found necessary before regular smelting could be undertaken.

Non-metallic.—Amongst the non-metallic class of minerals mined in Canada, the more important are mica, chromite, coal, corundum, gypsum, natural gas, petroleum and salt, besides the structural materials including the clay products, stone and lime and cement. The mining of all these products and others of lesser importance has been actively carried on during the year. The coal mining industry especially has made good progress in the various fields exploited, Nova Scotia, Alberta and Saskatchewan and the Crow's Nest Pass and Vancouver Island fields of British Columbia. In Alberta a rapidly growing population has created such a demand for coal that new mines are yearly opened up and a much larger output made. Nearly one-half the coal mined at the Crow's Nest Pass is converted into coke to supply the fast growing demands of the smelting industry in British Columbia and for export. Labour difficulties have interfered to some extent with the operations at Fernie and at Lethbridge, the latter causing a shortage of coal at certain points in Saskatchewan which threatened to become serious. These difficulties were, however, happily settled before the close of the year and no doubt in time to avoid any further serious trouble.

Asbestos mining in the eastern townships of Quebec has been particularly active during the year; prices have been good and a large increase in mill capacity to handle the mineral is contemplated. The

chromite ores of this district have also been mined about as usual.

Gypsum mining in Nova Scotia and New Brunswick and to a lesser extent in Ontario and in Manitoba has been carried on with increased output. Higher prices have also been obtained in this industry.

The corundum of Ontario finds a ready market; mica has been in good demand and at higher prices, while the natural gas, petroleum and salt industries of the Ontario peninsula have been worked as usual.

In the structural material class the production of clay products such as bricks, tiles, etc., stone and lime, has to keep pace with the growth of the population. The increased use of cement in all kinds of structural work such as buildings, sidewalks and roadwork, bridges and monolithic work, etc., has caused a great demand for this product and a largely increased output is consequently being made.

RECENT MINING DEVELOPMENTS IN SOUTHERN YUKON.

SOUTHERN YUKON continues to be noticed in the reports for publication of the Geological Survey of Canada. The latest Press Bulletin issued by the Survey contains the following particulars relative to mining in that district:

Until recently it had been generally supposed that the mineral wealth of the Yukon existed entirely in its placer deposits, and as these are mostly in the northern part of the territory, the southern part was considered of little value. The days of the individual placer miners appear to be almost a thing of the past, as none of the fabulously rich deposits such as caused the early Klondike excitements have recently been found, and the work of washing the sands and gravels is now chiefly carried on by large concerns, so the life of the Yukon, to some, appeared to be measured by the life of the gold sands to the north. However, quartz mining has recently become of such importance and promise as to practically dispel this former idea.

To reach this country the usual route is to go by boat from Vancouver or Seattle to Skagway, Alaska, a distance of about 865 or 1,000 miles respectively, thence via the White Pass & Yukon railway to Whitehorse, Yukon, a distance of 111 miles. From there steamers run down the river to Dawson, about 460 miles.

A few years ago a number of copper claims were staked just west of Whitehorse and some encouraging development work was accomplished, but for a number of reasons the camp had been, until this season, practically at a standstill. A few trial shipments of about 10 tons of ore were made. Three such samples from the Copper King gave returns of 46 per cent, 31 per cent and 29 per cent copper, and there appears to be plenty of such ore. This last season Byron N. White, of Spokane, commenced work on the Pueblo and by surface stripping uncovered a body of almost solid ore about 270 by 250 ft., and a shaft

was sunk in one place over 100 ft., and neither wall had at this time been found. The ore is hematite iron strongly impregnated with copper. The whole deposit seen would average at least 4 per cent copper, and carries some gold values. By hand sorting high grade shipments could be made. The contact along which the copper properties are located can be traced over fourteen miles, and is mineralized throughout the entire distance.

With this exception no quartz mining except a few assessments by prospectors in different places, had been done in this southern Yukon until about a year ago this last summer, when Col. J. H. Conrad commenced work on a number of properties in the Windy Arm district, which is along the railway, and about 40 miles south of Whitehorse. Since then considerable development work has been done on a number of properties both by the Conrad Consolidated and Anglo-American companies. The ores consist chiefly of high-grade silver minerals and gold in quartz veins, which are in true fissures, and vary from a few inches in width to more than 20 ft. Argentiferous galena is the chief mineral, often associated with rich silver minerals such as argentite, ruby silver and stephanite, and accompanied by pyrite and arsenopyrite.

The Conrad Consolidated has three Riblet aerial tramways in operation for carrying the ores of the different properties to the shores of Windy Arm; the longest being 18,697 ft. in length, with its upper terminal 3,469 ft. above the lower, cost \$90,000 to install. The others are much shorter.

Some shipments of ore have been made, but these were mostly trial shipments. The properties are as yet in the prospect stage, but for the amount of work done look promising.

The success of the Windy Arm properties encouraged prospectors to prospect more carefully this season, with the result that a number of valuable finds have been made. About the middle of June, quartz carrying free gold and telluride minerals was found between the Watson and Wheaton Rivers, about 18 miles southwest of Robinson siding. These quartz veins were traced in a belt about two miles wide for about 20 miles in a southeasterly direction and more than 700 locations were made. The quartz is well mineralized in places, carrying gold and silver values chiefly. However, no work has been done as yet to determine what values the veins really carry. The telluride ores from the original discovery on Gold Hill assayed into thousands of dollars per ton, but only a small amount of this was found. The average surface assays were, however, encouraging.

A large body of stibnite carrying mercury was also discovered towards the end of the season, to the west of the other properties.

So considering that there were only a few men in the country and these prospecting only a very short time, the results go to show over what wide areas the valuable ore deposits of the Yukon are distributed.

Added to this there is plenty of coal in the district.

An extensive line of subterranean lines will connect the Whitehorse copper deposits, and is easily accessible from the railway. Coal is also being mined down the river north from Whitehorse in different places, and will probably be found much closer to Whitehorse. The samples taken from Tantalus and Tantalus are of the highest quality, and will produce coherent coke. A smelter at Whitehorse, to treat the copper ores there, is, consequently, one of the probabilities of the near future. There is plenty of water power in the vicinity.

AN ENGLISH FIRM'S REVIEW OF PRICE OF COPPER IN 1906.

COPPER PRICES advanced considerably in 1906. In their report for the year, James

Lewis & Son, a well-known London firm, state: An unprecedented advance has taken place in the value of copper during the year 1906, in consequence of the great expansion of trade throughout the world, and in sympathy with the extraordinary demand for iron, steel, and other metals, especially in the United States and Germany. Production has been curtailed by scarcity of labour in the United States and in Chili, and also by deficiency of means of transport in the United States, while the extended use of electricity for motive power has created an increased demand for this necessary metal. Advantage has been taken of the optimism generally prevailing to enhance the cost of copper to consumers 32 per cent.; large purchases of Standard being made by speculators and also on behalf of American producers, the moderate stock available—although it has increased 77½ per cent., or 3,108 tons—enabling those controlling it to rapidly force up prices to their present high level. In the course of the year the value of Standard copper was enhanced £25 10s. per ton—from £79 15s. to £105 5s.—though as low as £74 for three months prompt was accepted in January, and as high as £109 10s. realized in December—a difference of £35 10s. per ton. During the first seven months there was little change in values, but early in August a steady and persistent advance commenced, starting at £81 7s. 6d., and, stimulated at first by fear that the earthquake in Chili would diminish shipments from thence, and subsequently by the favourable harvest and consequent increased industrial activity in the United States, large sales of American Lake and electrolytic copper were made to home consumers and also for export for delivery up to the end of the year. These sales continuing with delivery extended to the first three months of 1907, copper for early delivery was found to be scarce, and the limited stock of Standard being almost entirely controlled by one firm, the price of this medium of speculation was rapidly forced up above that obtainable for refined copper.

COPPER DEPOSITS OF WASHINGTON, U. S. A.

By Hon. Albert W. McIntyre, Everett, Washington.

THE CASCADE CHAIN of mountains forms the central divide of the State of Washington. The rocks are granites, flanked by Palaeozoic, Mesozoic and metamorphic strata, and are much like the Sierras of California. They were upheaved in large part before the Cretaceous, and, since then, other movements have occurred. There are vast developments of igneous rocks, forming, as at Mount Rainier, some of the highest American peaks. West of the Cascade Range is a great valley formerly marking a drainage system, but now covered, partially, by glacial drifts, and largely by the waters of Puget Sound. The glacial deposits are enormous, and render the problem of working out the geology very difficult. Some glaciers remain on the heights, even to the present day. West of the Puget Sound basin is the northern extension of the coast range, locally known as the Olympics, and largely Cretaceous and Tertiary strata.*

This is an area of granite, traversed by late eruptives, and suggests geological conditions known to be favorable to copper deposits elsewhere, as at Butte.**

Prof. Milnor Roberts, dean of the school of mines of the University of Washington, says: "On the western slope of the Cascade Mountains in Washington in the region where the Great Northern railroad crosses the Cascade Range, is a belt, about 50 miles in length and several miles in width, extending both north-west and south-east of the railroad in which veins bearing copper (chiefly), gold and silver are numerous."

This region, so far as the outside world is concerned, is almost a *terra incognita*, many things having combined to deter discovery and development of mineral deposits. The prospector on the Pacific coast, looked, and still looks, for gold placers, next, for gold-bearing quartz. He was not in the position to profit by the discovery of copper-bearing veins or deposits, even if he had recognized them. They were simply "base" and worthless to him. An illustration is to be found in the Copper Mountain lode in Shasta county, California, which was known to prospectors for many years before it was suspected to contain large and rich copper deposits. If the prospector had known that there were copper deposits beneath these unprofitable cappings it would have made no difference to him. Transportation was impossible without trunk lines, either to bring out the ores or take in the necessary metallurgical plant. The almost impenetrable forests covering the slopes of the Cascade Mountains, render prospecting extremely difficult and add greatly to the work of

prospecting the higher peaks and ridges of the granite core, which can be reached only by trails cut, at heavy expense, through the timber and underbrush, tropical in their density. Where some of the more accessible veins were discovered, often in the edge of the belt, capital to develop, in amounts adequate to the purpose, was not obtainable, with the result that mere attempts were made with trifling capital, and often with management that would have failed with any capital, however great. The local community, without knowledge of mining or mineral resources, being farmers and loggers, could not be appealed to successfully for even the little capital in its possession, and which was largely dissipated during the stringent times of a dozen years ago. Without capital, often without the sympathy even of those engaged in other industries about them, the few who appreciated somewhat the character and value of the mineral resources of this region and strove to utilize them, struggled against a situation that would have discouraged anyone not absolutely convinced of the existence of copper deposits worth every effort and sacrifice to develop and market. The mining-stock sharper added his brilliant efforts to the sum total of drawbacks.

The discovery of gold in the Klondike swept practically every miner and prospector of the Cascades into the "frozen" north and only recently has something like a reaction set in that permits attention to be called to nearby resources of even greater permanent value.

Unfortunately for the development of the copper belt, as well as the valuable gold veins in the Mount Baker and Slate Creek regions, the Monte Cristo arsenic-gold district became identified with and regarded as typical of the whole Cascade Range and of the whole State. As a gold-arsenic producer, the district has no place here, but the effect of its geological character and its experiences, upon the development of the copper deposits, justify an attempt to differentiate and distinguish briefly the latter from the former.

So far as the writer is aware, the Monte Cristo mining district is the only one in the Cascades specially reported by the United States Geological Survey. J. E. Spurr's report is able, careful and comprehensive, so far as information was available at the time it was made. He distinctly avowed his limitations resulting from insufficient data, and conscientiously distinguished between fact and fancy. His statement concerning the character of the veins under consideration, that they were not "true fissure veins," but mineralized joints, was interpreted, against his caution, into a declaration that there were no "true fissure veins" in the Cascades. Mr. Spurr's statement, while guarded, that the data at hand indicated that as the joints were more open to the entrance of mineral-bearing solutions, at or near the surface, and tighter below, the ore bodies either did, or could be expected to, "pinch out" at depth. These two statements were interpreted to mean that in the Cascades the veins and the ores "did

*Kemp's "Ore Deposits of United States and Canada."
Mining and Scientific Press, Nov. 24/00.

not go down." He stated his opinion to be that the ores were the result of deposition from descending waters. None of these statements nor the interpretation placed upon them, would have been remembered but for the fact that the Monte Cristo district, for whatever cause, seemed to belie the name. Not unnaturally, it was taken as a type and sample of the whole Cascade Range, and its apparent failure was regarded as a demonstration of the valuelessness in a mineral way of the whole state of Washington, although the district was and is peculiar here, as it is peculiar in the rest of the United States, for the largest element of value in the ores is arsenic.

The failure in the past at Monte Cristo is claimed, with good evidence, to be due to high freight and treatment charges, to excessively wasteful methods of mining, of transporting the ores from mine to concentrator and railroad, and of concentration, and the failure of the mine owners to receive any return whatever for the arsenic, which was the chief value in the ore. It is only fair to state that prior to 1901 the smelter did not save the arsenic, of which there was, during the period when it was saved, an average value of \$9.34 per ton of ore or concentrates, according to the United States Geological Survey Report. Fairly reliable data give the average treatment charge before the shut-down as \$5; freight about \$4. These figures are for independent shippers. Some figures given are \$2.50 freight and \$7 treatment charge. The gold paid for averaged \$9.50 per ton, leaving some 50 cents margin for mining and transportation to the railroad. There is evidence that the Monte Cristo Mining Company paid \$1.50 to \$1.25 freight, and a \$3 smelter charge. The concentrator's custom charge is given as \$1 a ton. The cost of mining is not given. There was a mining company, a tramming company and a concentration company, as I learn on inquiry, besides the railroad company and smelting company. The loss in concentration is said to have been from 25 to 40 per cent. and even more.

In spite of these discouragements, several owners have been steadily developing during the last three or four years, and the workings have attained considerable depth. In one instance, in 1905, they drifted from a cross-cut tunnel 400 ft. below the old workings, and 700 ft. below the surface, encountering an ore body 11 ft. wide of shipping ore.

William E. Sutton, formerly superintendent of the Monte Cristo mine, whose name occurs frequently in Mr. Spurr's report, informs me that in the Justice, formerly known as the Golden Chord, the tunnel is more than 1,000 ft. deep, is 400 ft. lower than the former lowest workings, and is practically the same ore that was mined from the old Monte Cristo, arsenopyrite, the values somewhat better, and ore bodies about the same size. Another company has two miles of underground work, one portion of which is a cross-cut tunnel 1,800 ft. long, which intercepts three different veins, into which have been drifts driven into good ore in large bodies. In another property the tunnel is in the vein 1,000 ft. be-

low the surface, in ore. At the present time there is great activity at Monte Cristo. The Wilmans, the original discoverers and developers of this camp, are in ore 1,000 ft. below the surface and 1,000 ft. in, with the pay streak wider than it was at the surface and the values higher. They are now actively at work, as are also others, competing for ore shipments on a large scale. The great old underground conveyor that has been in use for years, and other equipment, are being replaced and renewed. Everybody is at work, both in preparation and in getting out ore. The cause of the activity, from reliable information on the ground, is that a contract or arrangement has been made or is about to be made with the smelter to treat the ore at \$5, smelter to pay freight, and the smelter to pay \$14 for the arsenic in the average ore, which, added to the \$9.50 in gold, makes \$23.50, less \$5 total charge, or \$18.50 for the same ore which returned only 50 cents margin out of which to pay mining and transportation to the railroad.

The writer is reliably informed that competent engineers insist that the great concentrator was built wrong end up and had other serious, if not fatal, defects, some of them common to early concentrating machinery. Power was furnished at large expense of fuel, with abundant water power close at hand. It must be remembered that these ore bodies were not on the large scale of copper mines and that the ores are low grade, especially when leaving out arsenic, and require economical methods to get a margin of profit. It is hard to understand why such tremendous expenditures on railroad (nearly \$4,000,000) and on plant were made for so comparatively small a mine; and why, obviously wasteful methods were continued for so long a time and why they were not changed and why the shut-down to stop losses did not occur many years sooner.

Sam Silverman, well-known miner and smelter man of south-east Alaska, has recently taken hold of the Pride, Mystery and Golden Chord with the Wilmans brothers, after thorough examination by himself and a number of mining and metallurgical engineers. Everything is being changed, new methods being adopted, water power to be used, and an arsenic plant to be erected unless the smelter pays for the arsenic, which is said to be worth \$15 per ton of ore, on account of the present high price of that metal. Mr. Silverman is in the active management.

After the notable failure of the Pride of the Mountains and the Mystery under the old ownership, the re-purchase and continued operations by the Wilmans brothers, and the investment and active taking hold by Sam Silverman, a practical, capable man, well aware of the history of Monte Cristo, with all the signs of failure writ large all over the camp—*for a grade concentration with other equipment*—men, are significant, and the outcome will be watched with interest.

Not doubting Mr. Spurr's conclusion that there are no "true fissure veins" at Monte Cristo, only mineralized joints, which seem, however, to answer the

purpose of containing ore bodies fairly well, it is not proper to assume, nor does Mr. Spurr state that there are no true fissures in the Cascades.

Mr. Spurr mentions the absence of hot and other ascending springs as indicating that ore deposition must have resulted from descending waters.

In the copper region mentioned, which lies westward from Monte Cristo, there are hot springs at Madison, Hot Springs, in King county, about six miles west of the Cascade tunnel on the Great Northern railway; at Green River Hot Springs, King county, twelve miles west of Stampede tunnel on the Northern Pacific railway; and Hot Springs near the headwaters of the Snoqualmie and at the head of Foss River in King county, Copper Lake is much warmer than its neighbours, apparently owing to hot springs beneath. Near Berlin, on the Great Northern railway, in King county, there is a locally noted soda spring, and on the north fork of the Skykomish River, above Galena, in Snohomish county, are important mineral springs, and near Mount St. Helens, in Cowlitz county, near Skamania county, are strong soda springs.

As the character of the veins is important, I may be pardoned for illustrating the fact that there are true fissures, or as Mr. Spurr designates them in the report, "true fissure veins," in abundance, in the Cascades, as well as elsewhere in the State of Washington. The Apex mine, in King county, on Money Creek, has about 5,000 ft. of development, as I am informed by Mr. Abner Giffin, president of the owning corporation. The ore is arsenopyrite, the same as that of Monte Cristo, carrying from \$35 to \$50, chiefly in gold and silver, not allowing for arsenic. The No. 5 tunnel is the fifth level and gives 2,500 ft. of backs above it. No. 4 is about 2,000 ft. in and above 1,000 ft. perpendicular. The ore at this point is the same in quality and much greater in quantity than 700 ft. higher up. The vein is 4 ft. wide at surface, with an 8-in. pay streak of \$35 to \$50 ore. Various levels have been run on this vein, which is throughout of the same width, with clean granite walls, the pay streak increasing with depth until on the lowest level it is about 20 in. with the same values. This is a shipping and paying mine and is now building six miles of narrow gauge railroad to reach the Great Northern.

The Copper Bell lode, in Snohomish county, five miles from Index, is a true fissure. V. V. Clark, manager, reports that the walls are hornblende-biotite granite, the vein is 10 to 12 ft. wide, and a level has been run 2,650 ft. in the vein to a point which is 1,450 ft. below the surface, the vein continuing to be of the same width, except that where the ore shoots or pipes occur, the mineralization reaches into the walls, making one ore shoot 65 by 35 ft.

The Bonanza Queen, at Silverton, Snohomish county, is 60 ft. wide at the surface. A cross-cut tunnel 1,090 ft. long cuts the vein vertically 1,000 ft. below. At this point the vein, with well-defined walls, is 134 ft. wide. On the surface from the

highest point, 3,600 ft. above sea-level to the lowest point, 2,100 ft. above sea-level, along the vein, a glacial stream has washed a deep gorge, exposing the walls and the vein contents, on one side of the ridge for a distance of 4,000 ft. On the other side of the ridge, for 3,000 ft., the vein is exposed at numerous points, and the tunnel has cut it in the middle of the hill as stated.

These are the typical veins of this region, not the Monte Cristo joints.

There is more being done now in the State of Washington, in the mining way, than ever before and nothing is being said about it. The time and limits of this paper will not permit more than mention of gold camps in the Slate Creek, Mount Baker and Blewett districts, where, in several well marked instances, active production is going on and the outlook is very promising.

The quiet, steady work mentioned is bringing close to the point of production a considerable number of desirable copper deposits which will soon take on the maturer and more attractive title of mines.

Some dozen or more are actually mines now, having large ore bodies developed, "ore in sight," and require only equipment and transportation, which in a number of instances, are being supplied. In one instance a railroad 25 miles long is being constructed in a precipitous mountain region by the company owning the mine, 16 miles of the mountain end of the grade being completed. A large amount of development work has been done in this case, many hundreds of feet of it, all in ore. The railroad's first use will be to take in a plant to treat the ore. Only assured large bodies of paying ore would justify such expenditures.

In the absence of excitement, and when capital is so much engaged elsewhere, it is obvious that only those having undoubted merit will be developed and equipped. The region indicated above should properly be extended so as to include the many large copper deposits partly developed in Chelan, Okanogan, Ferry and Stevens counties and in Skamania and Lewis counties. In fact, the Washington copper deposits blend, by the course indicated, into those of the Boundary district of British Columbia, where the Granby and others are now producing copper abundantly. The difference, where there is a difference, is that the natural showing and development, considerable in several instances, justify the statement that the higher grade copper deposits are those of the Central Cascade portion of the copper belt.

An important feature in the operation of the mines will be the water power of this region. Prof. Henry Landes, state geologist of Washington, has stated that the water power in the Cascades is unique. "If every atom of fuel, coal or wood, were removed, every wheel that could possibly ever be needed, whether for transportation, agriculture, manufacture or mine, in this whole region, could be turned by water, with an abundance to spare."

In mining, fuel is one of the most important items

of cost. The absolute elimination of this expense means a material lessening of the cost of mine products, bringing very low grade ores into the territory of commercial value and increasing the profits of high grade.

The abundance of timber for all purposes, the position of the ores admitting operation for a long time, by tunnel, and the ever present water power combine to make ideal, economical conditions.

The copper belt, first mentioned, begins among the headwaters of the Foss River, which flows north; of the Snoqualmie, which flows southwest; and the Cleallum, flowing southeast, about latitude 47 deg., 30 min., and longitude 121 deg., 15 min. The belt extends through the adjoining portion of King county, north-northwesterly, into and through Snohomish county, and seems to be a part of a belt or trend which appears on the coast and in the islands of British Columbia, in Prince of Wales and other islands of southeastern Alaska and on Copper River, Alaska. South of this belt, in the Cascades, in Washington, is a known copper region which I will describe later. It is obviously impossible to do more in this paper than to take up, briefly, a few typical copper deposits in the State of Washington; in no case reflecting upon those not selected. I may remark that in general the region is characterized by strong, wide veins, usually in granite, occasionally in diorite or slate-diorite contact, with abundance of igneous dykes both acid and basic. In the southeast portion of the belt, in King county, the Coast Range is from 3,000 ft. to 6,000 ft. in height and the summits have been swept clean by glaciers, in former times. The structure and vein systems exposed, at one point, on the surface may often be traced with accuracy long distances.* In Snohomish county the belt is in the lower hills of the Cascades, where heavy forests cover the plateaus, slopes and valleys, and only occasionally are veins easily traced, without work. There are, however, many instances of veins made plainly visible by erosion.

It has been difficult to secure accurate data, in some instances, but the writer has taken pains to avoid error, as far as possible, and made use of no information not entirely reliable.

I shall now take up a few types for, as stated, it is not within the purpose or scope of this paper to make a catalogue of the copper deposits of Washington, but merely to call attention to their existence.

I shall begin with the first one I became acquainted with, after a difficult climb over a glacier. On the high divide between the east fork of the Foss River and the middle fork of the Snoqualmie, at an elevation of 5,800 ft. above sea-level, in a hornblende-biotite-granite country, the flat surface of an ore shoot on the Dutch Miller shows as plainly as a strip of carpet, 18 ft. wide and about 175 ft. long; 12 ft. of the width is a solid chalcopryite, somewhat mixed with hematite and slight quantities of zinc. The other 6 ft. is composed of about half and half

chalcopryite and quartz. Evidently part of the original vein above the present surface had been carried down the canyon when by glacial action. Several times and in places of this ore have some been assayed; it is now being transported to facilities, where some is being supplied by a railroad, for six and one-half miles of which the grade has been completed through a rough valley, and an aerial tram of five and one-half miles, the contract for which has been let by a representative of the Trenton Iron Company. C. E. Crane writes me that a careful sampling of all the ore taken out (several thousand tons) gives 16 per cent copper, 8 oz. silver, trace of gold, 28 per cent iron, 28 per cent sulphur, 3 per cent zinc, and I believe it from considerable knowledge of the ores. The open-cut and shaft work done in taking out this ore shows the vein to have well-defined walls of granite. The bottom of the shaft, some 60 ft., is in ore. At points along the surface of these veins, where the erosion has not removed the capping, is oxidized iron ore mingled with hornblende and quartz. The vein can be traced by the iron stain until it disappears under a glacier.

About 6,000 ft. from the ore shoot above described, following the gossan, an opening on the Lucky Boy has been made through the thin cap, disclosing chalcopryite ore, in a vein of about the same width. No great amount of work has been done here, the object being to prospect, not to operate, at this point. This is all in an exceedingly rough and precipitous region. About two miles further in the same general direction, northwest, the Pedro ledge is stated to be more than 100 ft. wide and the showing is said by C. R. Blodgett of Seattle to be greater than that of the Dutch Miller; walls are of the same granite, iron capping with quartz pockets which are lined with crystals of quartz and iron cubes. The ore is chalcopryite and bornite containing gray copper, gold and silver, with some bismuth and antimony; assays show high values in gold, silver and copper. This ledge can be traced more than two miles and leads to the Copper Chief and Eureka veins and others of the Foss River group. At the head of the west fork of Foss River the Copper Chief is by measurement 189 ft. wide at the Malachite Lake end and still wider on the Miller River end, where it is covered by talus, being plainly traceable for more than 4,000 ft. It has the same iron cap, hematite, limonite, hornblende and quartz, which has been penetrated at various points, disclosing remarkably pure bornite with gold and silver values, and ranging from 3 per cent to 54 per cent copper, gold from trace to half an oz., silver 2 to 46 oz. The Eureka vein is from 50 to 100 ft. wide, of like character, nearly parallel to the larger vein, as are four others ranging from 10 to 20 ft. in width, and more than 2,000 ft. in length, passing over a high ridge. Here on Foss River development now takes the form of a tunnel to cross-cut all of the veins of the group at an average depth of 1,000 ft. Chalcopryite of a high grade has been uncovered in several of these parallel veins. This group will be supplied with transportation by the railroad to the

*Professor Milnor Roberts.

Dutch Miller. To the south of the Dutch Miller vein, first mentioned, in the Clipper group, the veins are larger and are in the same granite. One tunnel 200 ft. on the vein is all in ore, one 750-ft. cross-cut tunnel is in ore at the breast. From what are described as ore bodies containing more than 1,000,000 tons, general sample assays of different levels are stated to show $3\frac{1}{2}$ per cent to 10 per cent copper, about 2.4 oz. silver, 0.02 oz. gold. It is to this property that the 25 miles of mountain railroad is being actually constructed.

Ten miles north of Mount St. Helens, on the north fork of the Toutle River, on the line of Skamania and Cowlitz counties, the Polar Star, as reported by E. A. Sessions of Portland, has a tunnel on the vein 700 ft., all in ore, after passing through 100 ft. of iron sulphide capping, country rock, hornblende-biotite-granite. Gangue is iron sulphide in an altered granite. A cross-cut of 69 ft., 600 ft. from the tunnel mouth, shows 18 ft. above 10 per cent copper; 15 ft. above 15 per cent copper, with \$5 gold, 16 oz. silver; and 36 ft. average 3 per cent copper, with 0.15 oz. gold and 10 oz. silver. This is one of several veins, one other being equal to it. It is 25 miles from the railroad. The Tacoma & Eastern, now being built, will come within five miles of it.

Mr. Sessions states that the Sweden and Norway, nearby, has a tunnel 2,300 ft. on the vein, in ore all the way, after 150 ft. of iron sulphide capping. Chalcopyrite ore in cross-cut of 23 ft. shows 7 per cent to 10 per cent copper, with gold and silver similar to the last described. There are others in the district. These are the best developed.

The Sunset in Snohomish county, north-northwest of the Foss River group, is in the same granite walls, has three levels at about 100 ft., 200 ft. and 300 ft. depths, which, with upraises, expose, according to the report of W. E. Sutton, former superintendent of the Monte Cristo mines, and mentioned repeatedly by J. E. Spurr, in the Geological Survey Report above referred to, one ore body of 60,000 tons of bornite and chalcopyrite, sampled by him at \$12 per ton when copper was at 13 cents, and another ore body of 40,000 tons with \$15, at same price of copper. Sample assays given in report (1) average across 17 ft. of vein in adit cross-cut 0.04 oz. gold, 1 oz. silver, 5.7 per cent copper; (2) average in vein 14 ft. wide, 50 ft. long, adit cross-cut, 9-10 oz. silver, 7-10 per cent copper; (3) sample of ore taken from floor of stope, old workings (above), 22.3 per cent copper.

The Bonanza Queen has been partially described earlier in this paper. A tunnel 1,090 ft. long has caught the vein 1,000 ft. below the surface and with upraises and levels, together with the natural outcrop, open cuts and quarry work, two principal ore bodies are said to be exposed. One is stated to be 500 ft. long, 15 ft. wide and 1,000 ft. deep. The gangue is pyrrhotite and pyrite. The best that could be done under the circumstances to get at the values gives from 2 per cent to 3 per cent copper, \$1 gold, and 5 oz. silver. The other ore body is said to be,

measuring in the same crude way, 400 ft. long, 200 ft. deep or high, 69 ft. in width—is a hard pyrite somewhat lower in grade of copper and higher in gold and silver than the last named, the silver increasing sometimes to 11 oz. at greatest depth. Sylvanite occurs frequently along one wall. This property is reported as shipping three carloads a week to the Tacoma smelter; net, per ton, after paying transportation and treatment charges, is stated to be from \$8.50 to \$23. The surface ores are being handled by quarry method. There is lime enough in connection with a part of these ores, according to Herbert Lang of San Francisco, to make only 4 per cent to 5 per cent coke necessary to reduction.

I must pass by many that deserve description here and shall briefly describe three groups lying between the section containing the foregoing and the Boundary district, British Columbia.

The Belcher mine, about twelve miles northeast of Republic and six miles from the Washington & Great Northern railway, is reported to have 3,400 ft. of tunnel and winze. Depth of vein, 385 ft.; width of vein, 80 ft., all in ore; width of small vein, 28 ft., all ore.

Ore is pyrite (gold bearing) to depth of 1,808 ft., below which it changes to chalcopyrite carrying 4 per cent copper, with 30 to 50 per cent excess of iron over silica, which varies from 3 per cent to 10 per cent Si. Much of this ore runs \$12 gold and \$8 copper, with no silver. The smelters pay a premium on this ore for all excess of iron over silica. The railroad spur to the Great Northern branch, a distance of nine miles, will be completed shortly, when they expect to begin shipments of 300 tons per day. Capacity of railroad is 1,000 tons per day.

Q. S. mine is about midway between Conconully and Loomis on an ore zone which is traced for several miles. It is an immense low grade sulphide copper ore in diorite, with iron, but very little gold or silver. The ore zone on this property is now said to be 1,000 ft. wide. Only one wall has been found which is granite. Near the surface the ore is silicious, but lower the silica is replaced, to a degree, by copper and there is an excess of iron over silica. Small lenses of good grade are struck, but as yet no very large lens of sufficient grade to operate alone; in lower levels higher grade is expected. One tunnel is in 1,000 ft., giving a depth of 1,000 ft.; another will be driven to give an additional 1,000 ft. Much of the ore now is better than the Granby ore.

On Palmer Mountain, near Loomis, at a depth of 200 ft., the Copper World Extension has 20 ft. of ore running 48 per cent iron, 4 per cent copper, 6 per cent silica. The Granby smelter pays a bonus of \$1.40 per ton for this ore. In addition, there is here a large quantity of ore running 1.5 per cent copper.

This very inadequate description certainly indicates the presence of copper deposits, of magnitude and value, which the owners feel that they have been justified in developing at, however, great effort, and from which they expect, with confidence, to reap the reward for their sacrifice, their pluck and their faith.

HIGH LEVEL GRAVELS IN THE KLONDIKE DISTRICT, YUKON TERRITORY.

By R. G. McConnell.

IN KLONDIKE DISTRICT the season's work consisted in measuring the volume and estimating as closely as possible the gold contents of the high level gravels bordering Hunker and Bonanza Creeks. In this work I was efficiently assisted by Jos. Keele, geologist, and F. H. Maclaren and F. O'Farrell, topographers, all of the Geological Survey staff. I was also fortunate enough to secure the services of such experienced miners as Robert Henderson, the discoverer of the Klondike gold-fields, and A. B. McDonald.

In the course of the season all the important bodies of bench gravels along Hunker and Bonanza Creeks, and the lower Klondike River, were measured as accurately as conditions permitted. The heavy covering of moss and muck which mantles most of the district rendered the definition of the back line of the gravels in a few places somewhat uncertain, but on most of the hills the outlines of the gravel areas could be closely followed by means of prospecting shafts.

The rocker was employed to obtain the gold values in the gravels. About 350 samples, measuring in most cases a quarter of a yard each, were rocked during the season. The samples where possible were taken in columns 6 ft. in height. Where the gravels were shallow several continuous sections from the bottom to the top of the deposit were washed at intervals along the face. In the deeper deposits continuous columns of the lower gravels only were washed. Above a height of 36 ft., samples were taken at intervals of about 20 ft.

In estimating the gold contents of the various gravel deposits due allowance was given to the statements of miners in regard to the values obtained in drifting and hydraulic operations. In most cases the values given agreed very closely with the results of our own work.

No attempt was made to sample the once rich pay streak running through the upper Bonanza Hill gravels. The pay streak in all these hills has been drifted out more or less completely, only occasional pillars and small areas of ground which the miners were unable to reach remaining unworked. These contain the principal values, but their distribution is so irregular that it was considered a closer estimate could be formed by generalizing the results of the various hydraulic operations now in progress than by a limited amount of sampling done by ourselves.

In addition to the Hunker and Bonanza Hill gravels, tests were made of several areas of bench gravels along the Klondike below the mouth of Hunker Creek.

Field work was completed at the end of September

and Messrs. Maclaren and O'Farrell immediately left for Ottawa, and have been engaged since their arrival in working out the volumes of the various tills. This work, and the estimate of values which depends on it, cannot be completed in time to appear in this year's "Summary Report," but will be published later on.

Mining on the Klondike creeks is at present in a transition stage. The individual claim-owner is being gradually replaced by companies owning groups of claims and working them with expensive plants. The fabulously rich placers which made Eldorado, Hunker and Bonanza Creeks famous have been mostly drifted out and the gravels which remain are too lean, as a rule, to be worked with much profit by the early pick and shovel methods. The necessity for a more economic treatment of the gravels has been met by the introduction of dredges on the creek and river flats, and hydraulic plants on the hills. During the past season four dredges were at work in the district and three others were in course of construction. Dredging in the Klondike where the gravels are thawed presents few difficulties. The gravels are very uniform in size and include few large boulders. The shattered bed-rock is also easily excavated by the buckets.

The hydraulic miners have had to depend so far on a small intermittent supply of local gravity water, or on water pumped up from the creeks, and no large plants are consequently in operation.

The insufficiency of the local supply has induced the Yukon Consolidated Company to undertake the construction of a ditch and pipe line designed to bring water from a point on Twelvemile River to the camp. The line has a length of 58 miles and a capacity of over 5,000 miners' inches. When completed it will add greatly to the productiveness of the district.

With 25 miles or more of proved dredging ground in the valley flats and tens of millions of cubic yards of low grade but still workable gravels on the benches profitable mining on the Klondike creeks is assured for many years.

Dominion, Sulphur and Quartz Creeks on the Indian River slope were not visited during the season. The valleys of all these streams still contain considerable unworked areas of medium grade drifting ground. Quartz Creek also is bordered for a couple of miles by an important white channel deposit only partly drifted out.

THE STATE OF ALASKA, N. S. A. has collected \$37,552.29 bullion tax during nine months to October 1, of last year.

The production of coal and oil in the State of Washington in 1905 and 1906, respectively, in short tons, was as under:

	Coal	Oil
1905	1,848,000	3,100
1906 (estimated)	3,200,000	60,000

*In "Summary Report of the Geological Survey of Canada for 1906."

CANADIAN MINING INSTITUTE.

ON MARCH 6, 7 and 8 next the Ninth Annual Meeting of the Canadian Mining Institute will be held at the King Edward Hotel, Toronto, Ontario. The secretary has notified members that the usual single fare rate will obtain over all Canadian transportation lines; that the King Edward Hotel offers a special reduced rate for members and others attending the meeting; and that an interesting programme of papers has been arranged. Members intending to be present at the meeting are requested to inform the secretary of such intention as soon as practicable.

The nominating committee, appointed in accordance with the by-laws, have submitted the following nominations for office for the ensuing year: For president, Frederic Keffer (Greenwood, British Columbia); vice-presidents, J. Bonsall Porter (Montreal, Quebec), W. G. Miller (Toronto, Ontario), and Wm. Fleet Robertson (Victoria, B. C.); secretary, H. Mortimer Lamb (Montreal, Que.); treasurer, J. Stevenson Brown (Montreal, Que.); council, to fill vacancies caused by retirement of members on completion of term of office, E. W. Gilman (Montreal, Que.), Jas. McEvoy (Fermie, B. C.), Frank B. Smith (Edmonton, Alberta), R. W. Brock (Kingston, Ont.), J. C. Gwillim (Kingston, Ont.), F. D. Adams (Montreal, Que.), H. E. T. Haultain (Craigmont, Ont.) and David H. Browne (Copper Cliff, Ont.).

It is hoped that some of the members of the institute resident in British Columbia will attend the meeting so that this Province, which is prominent in the Dominion in regard to the metalliferous mining and smelting industries, may be well represented and particular attention be directed to the considerable progress made during recent years in the production of minerals in this far western portion of Canada.

PUBLICATIONS OF THE GEOLOGICAL SURVEY IN 1906.

PUBLICATIONS of the Geological Survey of Canada since January 1, 1906, include a number of reports containing much information relative to the respective localities in which officers of the Survey have been working. Beside these several catalogues have been issued. Other publications are in the press.

The reports, etc., published last year are as follows:

No. 913. "The Mineral Pigments of Canada." By C. W. Wilmott. Pages 39. Published February 18, 1906.

No. 914. Supplementary List of Publications during 1904 and 1905. Pages 11. Published February 20, 1906.

"Mineral Production of Canada for 1905." Pages 16. Published March 15, 1906.

No. 939. "Preliminary Report on the Rossland, British Columbia, Mining District." By R. W. Brock. Pages 40. Published June 2, 1906.

No. 923. "Report on Chibougamau Mining Region." By A. P. Low. Pages 61.

No. 940. "Report on Graham Island, British Columbia." By Dr. R. W. Ells. Pages 46. Published July 20.

No. 888. "The Geology and Petrography of Mount Yamaska." By G. A. Young, forming Pt. H. "Annual Report," Vol. XVI. Pages 48.

No. 955. French edition of 923. Pages 57. Published August 2.

No. 947. "Summary Report of the Acting Director, for 1905." Pages 144. Published August 31.

No. 950. "Palaeozoic Fossils," Vol. III., Part IV. (and last). By J. F. Whiteaves. Pages 208. Published October 10.

No. 956. Catalogue of Publications. Pages 129. Published October 12.

No. 907. "Annual Report" (New Series), Vol. XIV. Pages 1193.

No. 911. "Annual Report" (New Series), Vol. XV. Pages 1025.

No. 905. "Cruise of the Neptune." By A. P. Low. Pages 355. Published November 19, 1906.

No. 928. "Section of Mines, Annual Report, 1904."

The following reports are going through the press:

No. 902. "Report of Brome Mountain, Quebec." By J. A. Dresser.

No. 942. "Report on the Upper Stewart River, Yukon." By J. Keele.

No. 943. "Report on the Peel and Wind Rivers, Yukon." By C. Camself.

No. 952. "Annual Report" (New Series), Vol. XVI. Pages 733.

No. 958. "Annual Report on Chemistry and Mineralogy." By G. C. Hoffmann.

No. 949. "Cascade Coal-field." By D. B. Dowling.

No. 961. Reprint of "Report on Nickel and Copper Deposits of Sudbury District, Ontario." By Dr. A. E. Barlow.

No. 962. Reprint of "Report on the Nipissing and Temiskaming Region, Ontario." By Dr. A. E. Barlow.

In Victoria, Australia, the greatest distance to which air is supplied by a rotary blower (Root's pattern) at the present time is 4,710 ft. This is at the Band & Loch mine, and includes the whole distance covered by air pipes from the surface to the faces at the 2,300 ft. level. The Star of the East mine follows close to this with 12-in. air pipes carried to faces at 1,900 ft. from the shaft. Two blowers, a No. 4 and No. 5, are used in the latter mine. Some years since, in an alluvial mine known as Winter's Freehold, in this district, one rotary blower was operated to ventilate faces at more than two miles distant from a shaft 400 ft. in depth. In that case the blower succeeded an old-fashioned pair of Cornish air ducts, to the very great advantage of all concerned with that mine.

FRIENDLY MESSAGES FROM "UNCLE SAM"
AND "BROTHER JONATHAN."

DR. R. W. RAYMOND, secretary of the American Institute of Mining Engineers, whose apt and graceful speeches on several occasions during the annual meeting of the Institute held in British Columbia in the summer of 1905 are still well remembered by many local residents who had the pleasure of hearing them, has once again contributed materially to the enjoyment of those who entertained the visiting members of the Institute and their friends, this time in England, where the American Institute was last summer welcomed and feted by the Iron and Steel Institute, which had the hearty co-operation of several other British institutes associated with metals, mining and engineering.

The Bi-Monthly Bulletin of the American Institute of Mining Engineers for November, 1906, contains an account of the proceedings at this, the ninety-first meeting of the Institute. From that summary of what transpired the following verses have been taken with the idea that they will be of more than passing interest to many readers of the MINING RECORD who have not heretofore seen them in print. Before quoting Dr. Raymond's introductory notes, though, it may be premised that the week spent in London witnessed a series of instructive visits to noteworthy institutions and works and of brilliant entertainments, commencing with a reception of the American visitors at the Grafton Galleries by President and Mrs. R. A. Hadfield. Passing over these without further mention, Dr. Raymond's account of the proceedings on Friday evening, July 27, is here reprinted from the Bulletin:

On Friday evening, the annual dinner of the Iron and Steel Institute took place at the Guildhall, which had been offered for this purpose by the Corporation of the City of London. This is said to have been the third occasion on which the Guildhall was thus tendered for a non-municipal purpose: the second having been that of the banquet given in 1880 by the Institution of Civil Engineers in honour of visiting members of the American Society of Mechanical Engineers and the American Institute of Mining Engineers. The nature of the first occasion referred to is not known to the writer.

President R. A. Hadfield, of the Iron and Steel Institute, occupied the chair, supported on the right by the Lord Mayor of London, and 600 guests were seated at the tables. Toasts were offered as follows:

1. His Majesty the King (patron of the Iron and Steel Institute, and Bessemer Medalist for 1906.)
2. Her Majesty the Queen, their Royal Highnesses the Prince and Princess of Wales, and the members of the Royal Family.
3. The President of the United States of America.
4. The Lord Mayor and Corporation of London (proposed by President Hadfield, and acknowledged by the Rt. Hon. the Lord Mayor of London).
5. The Imperial Forces (proposed by Lord Allerton, and acknowledged for the army by the Rt. Hon. R. B. Haldane, Secretary of State for War, and for

the navy by Admiral Sir Archibald L. Douglas, K.C.B., Commander-in-Chief at Portsmouth).

6. The Houses of Parliament (proposed by Sir Hugh Bell, Bart., President-elect of the Iron and Steel Institute, and acknowledged by Lord Stanley of Alderley for the House of Lords, and by Herbert Samuel, Esq., M.P., Under-Secretary of State for Home Affairs).

7. Our American guests (proposed by the Rt. Hon. Sir James Kitson, Bart., M.P., Senior Past-President of the Iron and Steel Institute, and acknowledged by President Robert W. Hunt, of the American Institute of Mining Engineers).

8. The Iron and Steel Institute (proposed by R. W. Raymond, Ph.D., LL.D., Secretary of the American Institute of Mining Engineers, and acknowledged by President Hadfield, of the Iron and Steel Institute).

The ladies of the party were received by Mrs. President Hadfield in the beautiful twelve-sided Common Council Chamber, and separately entertained at dinner, after which they were admitted as spectators and auditors to the galleries and balconies of the great hall.

At the close of the banquet a social reception was held in the magnificent Art Gallery, which contained on this occasion between 200 and 300 paintings, by eminent Flemish and modern Belgian artists, loaned for this purpose by their owners.

The Guildhall of London is the place of all ceremonial functions (including the annual election of the Lord Mayor and the Sheriff) and the centre of administration for the city proper, which occupies about one square mile in the heart of the metropolis. The first building on this site, of which little or nothing remains, is attributed to the 12th century. The present porch on the King Street front (an engraving of which adorned the menu of this banquet) is a beautiful piece of Gothic architecture, dating from 1430 A.D. The great hall, 155 ft. long and 55 ft. high, was built after the fire of 1666; but its exquisite openwork Gothic wooden roof and stained-glass windows are modern. It contains marble monuments to Nelson, Wellington, and Pitt, and two mysterious ancient wooden statues of giants, traditionally known as Gog and Magog, and said to represent two survivors of a conquered tribe, who were brought as captives to London, and compelled to stand as warders at the gates of the royal palace.

No attempt was made to report the addresses delivered at this magnificent banquet; and the secretary has hesitated to make an exception apparently in favour of himself. But perhaps he may be excused upon a plain statement of facts. On October 2, 1890, at the dinner of the Iron and Steel Institute in New York City, Dr. Raymond made an address, concluding with some verses, entitled "Uncle Sam's Welcome," which had the good fortune to please our English visitors. In 1906, President Hadfield, inviting Dr. Raymond to make one of the addresses at the Guildhall banquet, recalled in flattering terms these forgotten rhymes of 16 years before, and expressed a strong desire that the author thereof should include in his

Guildhall address "something more of the same kind." In response to this invitation, Dr. Raymond read at the conclusion of his speech in the Guildhall, verses entitled "Sez Jonathan."

Unfortunately, the shape and immense size of that hall made it impossible for any speaker (except the megaphonic official herald who announced each toast in tones not to be ignored and never to be forgotten) to be heard by more than a small part of the assembly. Moreover, the natural (and perfectly proper) fate of an orator who comes after the time when newspaper reporters must hand in their "copy" for the morning papers, is to be classed with those who, in turf parlance, "also ran." Consequently, Brother Jonathan's message was neither completely heard at the time, nor published immediately thereafter.

Moreover, "Uncle Sam's Welcome" is out of print, and the author is unable to comply with requests for copies of it, or of its recent supplement. He therefore yields to the request of discreet friends so far as to reprint both productions, with a few words from each address, needed by way of introduction.

From the Address of 1890.

I say our fathers were your fathers' brothers; in other words, your uncles. That is why U. S. stands for Uncle Sam, in view of which significant circumstance I beg to conclude with offering to you:

UNCLE SAM'S WELCOME.

I'm glad to see ye! Walk right in!
Set down and rest, and feel to hum.
Ef thar's one thing that makes me grin,
It is, to hev good company come.
Thet's wut I am,
Says Uncle Sam.

I hev my times o' gittin' riled,
Times when I let my eagle scream:
But ginerally I'm ez mild
Ez apple-sass, fixed up with cream—
Meek ez a lamb,
Says Uncle Sam.

I've got ez quick a hand to shake
An *open* hand, ez ever you see;
Although I reckon folks don't make
Much profit shakin' *fists* at me.
No *ma'am*!
Says Uncle Sam.

My doors air open all the time
To free, true men of every name;
But when the bummers' guard of crime
Brings riot's flag of blood and flame,
Them doors I'll slam!
Says Uncle Sam.

My table's big; my eatin's good;
There's plenty in the pantry, too,
For all the world. In fact, I could
Export more vittles than I do—
Especially *ham*!
Says Uncle Sam.

I've got a continent o' coal
An' gas—you bet!—just hear it roar,
Thar's stacks to melt, and mills to roll,
An' trains to haul—an' ez fur *ore*—
A puffleck jam!
Says Uncle Sam.

Now don't you mind me ef I brag;
Thet's jest my way to show I'm proud
To hev ye fetch yer carpet-bag
An' visit. Ef I speak too loud,
Why' thet's all flam,
Says Uncle Sam.

Fur I'm pertickilarly fond
O' sittin' down to talk an' dine
With brothers from across the pond,
Whose mother wuz the same ez mine.
I aint no *clam*,
Says Uncle Sam.

I'd like to show ye round my place,
From north to south, from east to west;
But 'tain't no use, into the space
You engineers have so compressed
Thet job to cram,
Says Uncle Sam.

So make your plans to stop a while;
An' ef you sort o' call to mind,
Thet little transatlantic isle,
Jest send the folks you left behind
This telegram,
Says Uncle Sam.

Don't worry over our delay,
They're goin' to put us through, or bust!
An' ef a few weeks more we stay
Than we intended to, you must
Not care a—bit!
Says Uncle Sam.

From the Address of 1906.

The American Revolution of the 18th century was no conflict between England and America. It was simply a struggle, in both England and America, between the party of liberty and the party of tyranny, in which liberty simply won its victory on our side, sooner than it did your side, of the ocean. Your best and greatest men were with us. Even your common people refused to fight against us. It was because, even upon the offered inducement of double pay, Englishmen would not enlist to serve against their American kinsmen, that the British ministry of that day was forced to hire European mercenaries for that repugnant work. Our victory was your victory; our war-cry has long been yours; the principles we then declared are the principles you already cherished, and for which you have since shed English blood.

Sixteen years ago, I spoke in the City of New York to this same toast, "The Iron and Steel Institute," and ventured to express you "Uncle Sam's Welcome." In

view of what I have just said, I dare to enter with confidence tonight "Brother Jonathan's" message:

SEZ JONATHAN.

Now don't tell me the British Oak
Was split by any lightning stroke!
Bless your soft head, that wa'n't a split,
But just a fork, that doubled it!
For Freedom ain't no sapling slim
A-feared to grow another limb:
That's two big branches to that tree,
An' one is *you*, an' one is *me*,
Sez Jonathan, sez he!

Your bough's the biggest up to date;
But mine has struck a lively gait,
An', fust you know, she'll shove her way
Right alongside o' yourn, some day,
While through 'em both, from foot to cap,
Ting'les an' climbs the same old sap!
No matter whar them branches be,
Thar ain't but one trunk to that tree!
Sez Jonathan, sez he!

What's more, we're both a-branchin' yet
With every blessed chance we get;
An' every limb that we send out
Is welcome to grow staunch and stout
The sky above, the sile below,
Give room and food for all to grow,
An' limbs and leaves that flutter free
Jest add more glory to the tree,
Sez Jonathan, sez he!

Grow on, O stalwart oak an' tall!
Spread wide thy branches, great an' small,
While in their shelter nest the birds,
And in their shadow stand the herds!
Lift all thy heads to greet the sun
That crowns with splendour every one!
So men, till men shall cease to be,
May praise and bless the ancient tree,
Sez Jonathan, say we!

THE OUTLOOK FOR COPPER.

COPPER continues in strong demand at 25 to 26 cents per lb., says George L. Walker, in the *Boston Commercial*. Lake and electrolytic are being sold for delivery as far ahead as May and June at 25 cents. There are inquiries for September copper, but producers are refusing to make contracts farther ahead than four to five months. Consumers find it practically impossible to secure lots of copper for immediate delivery, as the cash supplies were long ago exhausted. This condition of things seems to have created the demand for far advance delivery contracts. Manufacturers who are requested to give figures on manufactured goods deliverable late in the year are unwilling to take chances on the price of copper, and as they are unable to find producers who will sell for August and September delivery they are obliged to fight shy of such business.

The fact should be appreciated more generally that copper is not sold at auction in the open market by any other commodities etc. Every producer and selling agent has his particular customers whom he supplies year in and year out with a given grade of copper from a certain mine or refinery, and the little copper that is dealt in in the open market represents the excess (either of supply or demand). The custom of buying copper for two to four months' advance account is the outgrowth of the contract system in manufactured articles. A street railway company, for instance, orders 1,000,000 lb. of copper wire and a car builder 2,000,000 lb. of brass trimmings for delivery four or five months hence. The manufacturer who takes these contracts, if he wishes to eliminate the speculative feature, must immediately buy his copper for delivery during the month in which he desires to begin using it. He thus protects himself as to the cost of raw material.

The speculative market in London has been used for two generations as a protection, or hedge, by foreign manufacturers of copper wires. When a customer made a contract to deliver copper goods several months in advance, he would protect himself in the copper market either by buying his refined metal at the current price and selling "G. M. B.'s" short; or through the purchase of "G. M. B.'s," if no refined copper were available at a satisfactory price, provided he feared an advance. He thus protected himself against financial loss in the event of either an advance or decline in metal prices. Of late years there have been such wide variations between the prices of "G. M. B." and refined copper that the greater number of manufacturers have discontinued the practice referred to.

The leading authorities in the copper trade freely express the belief that the average price of copper this year will be close to 25 cents. The production of the first half of the year is nearly all sold at about 25 cents, and as the last half of the year will be entered upon without any surplus supplies of metal in existence, it is safe to predict that there will be no weakening in market conditions until very near the end of the year, if then. There never was a previous time in the history of the trade when the outlook for the metal market was as rosy as it is at present.

Mining, with the metals commanding their present high prices, offers one of the best opportunities for legitimate investments today. Aside from gold, the price of which never varies, the other metals are at a remarkably high figure, and with a continuation of the general prosperity of the country, thus creating a constantly growing demand for silver, these prices are bound to be maintained. With silver worth 70 cents an oz.; copper, 23 cents a lb.; tin, 42 cents; lead, 6 cents, and zinc, 8 cents; mining presents the greatest opportunity in years. This fact is well understood in the Eastern money centres, and as a result money is freely offered for legitimate mining purposes.—*Black Hills Mining Review*.

COMPANY MEETINGS AND REPORTS.

BRITISH COLUMBIA COPPER COMPANY, LTD.

The directors of the British Columbia Copper Company, Ltd., have issued the following circular to the shareholders:

Your company having outgrown the capacity and usefulness of its two furnaces and operating plant, which had a capacity of treating about 550 tons daily, has within the year just past erected three modern furnaces having a daily capacity of about 700 tons each, or say 2,000 tons in all, and has so extended and improved its operating plant as to bring it up to the highest modern standard of efficiency.

The engineers who planned and who had these important improvements in charge estimate that the company will now be able to produce refined copper at about $8\frac{1}{2}$ cents per lb. and based on present prices of copper, with two furnaces, be able to earn approximately \$1,000,000 net per annum, to be increased when the three furnaces are operated.

Coincident with these improvements, the principal mine of the company has been further opened up to insure an adequate supply of ore for at least two furnaces. The company has also acquired additional mining properties of considerable promise, which are being rapidly developed.

The erection of the new plant and the improvements indicated naturally involved a stoppage of the company's operations for several months, cutting off its revenue and entailing heavy expenditures, with a resulting indebtedness which must be provided for from the net profits or through capital account.

The business of the company in smelting and converting ores and materials for outside customers is increasing, and everything should be done to encourage its growth, not only because profitable in itself, but because productive of considerable savings in the treatment of the company's ores. Carrying on this business, however, requires a larger working capital, inasmuch as custom ores and mattes must be paid for when delivered at the smelter, but are not realized on by the company until from 60 to 90 days thereafter.

Your board has, therefore, reached the conclusion that the company should be placed in a condition where its present free assets can be employed as working capital, and recommends an increase of the authorized capital stock by 200,000 shares of the par value of \$5 each (\$1,000,000) making the total authorized capital \$3,000,000, and to offer at par 116,160 shares, or \$580,800, of said increase to the shareholders *pro rata* in proportion to their holdings and subject to the favourable action of the stockholders. Members of the board have agreed to take all the stock at par not subscribed for by the shareholders.

As the company still has 12,800 shares of its stock in its treasury, this, together with the completion of the subscription, will leave 96,640 shares out of the total authorized capital available for such future uses, as may be hereafter properly authorized.

While all the three new furnaces are completed, only one is in blast, the prevailing car shortage making it impossible to procure an adequate supply of coke for the larger operations, but this difficulty is temporary only, and should before the end of the present month disappear. Steps are being taken to provide for sufficient storage to insure against a shortage hereafter from this cause.

With the company freed from debt it will be in condition to enter promptly on the payment of dividends.

If such increase of stock be authorized, stockholders of record at the closing of the books, on Wednesday, February 20, 1907, will be given the right to subscribe for an amount of stock equal to 30 per cent. of their holdings at that time and date, at the rate of \$5 per share, payable as follows: \$2.50 per share March 11, 1907; \$2.50 per share May 10, 1907.

Assignable "rights" and appropriate subscription blanks will be mailed to the stockholders on closing of the transfer books.

LETHBRIDGE COLLIERIES COMPANY, LTD.

The Lethbridge Collieries Company, Ltd., held its organization meeting recently at Winnipeg, Manitoba. The following shareholders were elected directors: J. S. Hough, Hon. Colin

H. Campbell, George Rogers (of Lethbridge, Alberta), Isaac Cockburn, Theo. A. Burrose, M. P., D. E. Adams and Jas. W. Bettes. Afterwards, at a directors' meeting, J. S. Hough was appointed president; Hon. C. H. Campbell and Isaac Cockburn, vice-presidents; and Jas. W. Bettes secretary-treasurer. The company's coal property is situated in Alberta, convenient to railways for transportation purposes. The coal is of excellent quality for domestic purposes.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi—December: Shipments amount to 9700 tons, containing 2,650 oz. gold, 3,950 oz. silver and 164,500 lb. copper. Estimated profit on this ore after deducting cost of mining, smelting, realization and depreciation, \$1,200. Expenditure on development work during the month, \$18,000. (Office note—The sinking of the main shaft has now been commenced, and this accounts for a considerable portion of the increased expenditure. Arising out of the late strike at the coal fields, there is still difficulty in regard to the fuel supply at mine and smelter. There is also a shortage of miners. It is anticipated that these conditions will improve in the near future.)

Le Roi No. 2—December: Shipped 870 tons. The net receipts are \$14,665, being payment for 920 tons shipped and \$1,563, being payment for 62 tons concentrates shipped—in all \$16,228. Small tonnage owing to shortage of cars. Expect normal tonnage January.

Tyee—December: Smelter ran 10 days and smelted: Tyee ore, 2,015 tons. Matte produced from same, 150 tons; gross value of contents (copper, silver and gold), after deducting costs of refining, \$30,970.

U. S. A.

Alaska Mexican—December: 120-stamp mill ran 20 days; crushed 13,620 tons ore; estimated realizable value of bullion, \$30,958. Saved 252 tons sulphurets; estimated realizable value, \$19,459. Working expenses, \$28,850. Secretary adds: Short run caused by shortage of coal.

Alaska Treadwell—December: 240-stamp mill ran 20 days, 300-stamp mill 17 days; crushed 50,705 tons ore; estimated realizable value of bullion, \$71,633. Saved 1,005 tons sulphurets; estimated realizable value, \$49,371. Working expenses, \$64,615. Secretary adds: Short run caused by shortage of coal.

Alaska United—December: Ready Bullion claim, 120-stamp mill ran 20 days; crushed 13,500 tons ore; estimated realizable value of bullion, \$20,443. Saved 237 tons sulphurets; estimated realizable value, \$7,593. Working expenses, \$21,796. Secretary adds: Short run caused by shortage of coal.

DIVIDENDS.

A dividend (No. 46) of 50 cents per share has been declared by the Alaska Mexican Gold Mining Company, payable January 28. Total of dividends paid to date, \$1,572,381.

A dividend (No. 75) of \$1.50 per share has been declared by the Alaska Treadwell Gold Mining Company, payable January 28. Total of dividends paid to date, \$9,235,000.

A dividend (No. 4) of 30 cents per share has been declared by the Alaska United Gold Mining Company, payable January 28. Total of dividends paid to date, \$306,340.

The Consolidated Mining and Smelting Company of Canada, Ltd., owning the St. Eugene, War Eagle, Centre Star and other mines and the Trail smelter, has declared its fourth dividend, viz., of $2\frac{1}{2}$ per cent. for the quarter ended December 31, 1906.

NOTES.

The Arlington Mines, Ltd., has had gazetted the customary notices of intention to apply for certificates of improvements preparatory to obtaining Crown grants of the Argo, Portia, Amos, East Side No. 2, and Bettina fractional mineral claims, all on Springer Creek, Slocan City mining division.

The Consolidated Mining and Smelting Company of Canada has commenced shipment of silver-lead ore from its Richmond group, situated near Sandom, in the Slocan district. The ore shipped was taken out in the course of development work, stopping for shipment in considerable quantity not yet having

been commenced. The ore is stated to average about 100 oz. silver per ton and 50 per cent. lead.

The New York Stock Exchange has listed 103,081 shares of the stock of the Granby Consolidated Mining, Smelting and Power Company, Ltd.; it will also list 31,919 shares prior to July 1, 1907, when this stock shall have been issued in exchange for stock of \$10 par value.

COMPANIES REGISTERED IN ENGLAND.

London Share and Stock Exchange, 11 & 12, Old Broad Street.
January 11, by Attenborough & Sons, 15 and 26 Thavies Inn, E. C., with capital £20,000, in £1 shares, to acquire any landed or other property in Canada or elsewhere, to carry on the business of farmers, graziers, meat and fruit preservers, brewers, planters, miners, metallurgists, quarry owners, etc. Minimum cash subscription, £1,000. The first directors are E. H. Turnbull, A. T. Wright, and J. W. Peters. Qualification, £200 shares or stock. Remuneration, £400 per annum, divisible.

Scottish Canadian Trust, Ltd.—Registered in Edinburgh, January 16, by Oswald & Son, Edinburgh. Capital £100,000, in £1 shares. Objects: To carry on financial, commercial, mercantile, manufacturing, mining, and other operations. The number of directors is not to be less than three nor more than seven; the first are to be afterwards appointed. Qualification, 500 shares. Remuneration, as fixed by the company. Registered office: 22 Meadowside, Dundee.

COAL MINING NOTES.

Vancouver Island colliery managers interviewed in Victoria were reported early in January to have stated that the demand for Island coal was very active. F. D. Little of the Wellington Colliery Company, was quoted as having said: "A keen demand for coal has sprung up along the Coast and hundreds of tons are being shipped north every month, while thousands of tons are being sent weekly to San Francisco, California." He added that the output of the Wellington (Extension) mines, which usually averages about 1,100 tons per day, had been temporarily diminished by 300 to 400 tons per day by reason of an epidemic of la grippe among the miners. Thos. R. Stockett, of the Western Fuel Company, Nanaimo, said that the demand for the output of coal had been greater recently than at any previous time. He attributed the increased demand to an enlarged population, a rise in the price of wood, and industrial conditions generally. For some time past the output of the Western Fuel Company had reached 1,600 tons per day. So great had been the increase in the demand for domestic purposes that he estimated it to be 70 per cent. more than at the corresponding period of last year. At the same time the shipping demand had also greatly increased and consignments of coal were sent in increasing quantities to both British Columbian and Alaskan ports.

The Hillcrest Coal Company has closed its coal mine near Frank, southwest Alberta, owing, it is stated, to its inability to get railway cars for the shipment of its product. There appears to be a probability of work being resumed shortly.

The *Fernie Free Press* states that a contract has been awarded Wm. Sandridge of Coleman, Alberta, for delivering 600 cu. yd. of building stone for the construction of a trial battery of coke ovens at the Canadian Pacific Railway Company's coal mine now being developed at Hosmer, Crow's Nest Pass.

A record output of coal was made at the Crow's Nest Pass Coal Company's Coal Creek mines on January 29. The production on that day was 2,600 tons. The *Free Press* further states that the company's purchasing agent and the superintendent of its car repairing shops have gone to Pittsburgh, Pennsylvania, to purchase slack cars for the Morrissey, Fernie and Michel railway. Work has been resumed in the company's No. 5 mine at its Michel colliery which mine was closed during the very cold weather. Larger pumps have been installed in this mine.

The Frank Paper says that the secretary of the local board

inquiring whether the mines of The Pass could and would furnish coal for Calgary if a sufficient supply of cars could be had. The companies operating locally authorized the reply that the mines would undertake to supply an unlimited amount of coal if the cars could be obtained for its shipment.

Two of the largest scows ever built at Vancouver have been launched. They have been built to the order of Macdonald, Marpole & Company, and will be used carrying coal from Vancouver Island mines to the City of Vancouver. The dimensions are: Length, 100 ft., beam 32 ft., and depth, 10 ft. Each will carry between 600 and 700 tons of coal. Three more scows of similar dimensions are to be built.

TRADE NOTES AND CATALOGUES.

The Canada Foundry Company of Toronto, Ontario, has established a special department for the construction of steam shovels, the Canadian Pacific Railway and Canadian Northern Companies, and several railway construction firms having placed orders with it for these machines.

The Canadian Westinghouse Company of Hamilton, Ontario, has distributed "The Westinghouse Diary," a pocket diary which, in addition to providing memoranda blanks, gives much information of a technical nature. The statistics are comprehensive and useful. Altogether this handy diary will be welcome to many, particularly to electrical workers.

In El Oro and Guanajuato (Mexico) alone the Westinghouse Electric and Manufacturing Company has installed more than 10,000 h. p. of electrical machinery, all of which is driven from a water-power source.

The Canada Foundry Company has published an illustrated booklet entitled "Steam Specialties" containing instructive information relative to new and scientific steam devices. From the same office has been issued a leaflet descriptive of the "Walker" fire hydrant.

"Some Notes Upon a Method of Drawing with Modern Appliances" is the title of a pamphlet, by W. F. Stanley, received from W. F. Stanley & Co., Ltd., London, England. Several interesting features of a new method of drawing are described in it.

The latest booklet received from the Canadian Rand Drill Company of Montreal, Quebec, is attractively printed in blue ink. It shows Rand drills employed in various capacities and gives information as to those using them and the excellent results they achieve. It claims that these drills are used extensively by the largest mining companies of the Canadian West, including the Consolidated Mining and Smelting, Pacific Coal, Le Roi No. 2, White Bear, Granby, British Columbia Copper, Dominion Copper and Daly Reduction companies, thus evidencing the merits of these machines in every day use.

Mussens Limited of Montreal, Quebec, is publishing a series of catalogues and leaflets, dealing with railway, mining, and contractors' supplies, etc. Catalogue No. 8 gives particulars of wheelbarrows and trucks, No. 9 of steel and twist drills, and No. 10 of some mine supplies. The Reading multiple gear chain hoists are described and illustrated in a booklet, while hoisting machinery and barrel forges are the respective subjects of two leaflets.

Hadfield's Steel Foundry Company, Ltd., of Sheffield, England, through its sole Canadian representatives, Peacock Brothers, engineers, Montreal, Quebec, is supplying the British Columbia Copper Company with one of its rock-crushers for installation at the Oro Denoro mine, Boundary district. This crusher is entirely of steel and has an opening 24 by 18 in. It will be driven by an electric motor.

tricle recommends the admixture of a solution of 2 parts of caustic potash, 2 of alum, and 10 of water with the mortar, 1.5 kilos of solution being used per bag of cement. Concrete walls are then coated with this mortar. A patent has been obtained for impermeabilizing concrete and preventing efflorescence by adding paraffin, stearin, colophony wax, etc.

ORE PRODUCTION NOTES.

PRODUCTION OF ROSSLAND MINES IN 1906.

The Rossland *Miner* has published the following relative to the production of ore by the mines of that camp:

In an appended table is given the figures for the tonnage of ore produced during the 12 months ended December 31, 1906. It will be noted that the tonnage is 277,361, which is considerably less than in 1905. The falling off is attributable to the strike of the employees of the Crow's Nest Coal Company, which lasted two months. Estimating the value of the ore at \$12 per ton, which is a low valuation according to one of the most reliable authorities, it gives a total of \$3,328,332. With a desire to be conservative the figures have been rather under-estimated than over-estimated. The following are the details of production:

	Tons.
Le Roi	126,396
Centre Star group.....	114,500
White Bear	570
White Bear (milled).....	1,350
Le Roi No. 2.....	21,000
Le Roi No. 2 (milled).....	10,500
Jumbo	2,600
Mabel	25
Crown Point	355
O. K. (milled).....	65
Total.....	277,361

PRODUCTION OF BOUNDARY MINES IN 1906.

The production of the mines of the Boundary district in 1906 is shown by the Phoenix *Pioneer* to have exceeded that of 1905 by about 225,000 tons. Particulars of output of the mines are as under:

	Tons.	Tons.
Granby Company's mines.....		801,404
B. C. Copper Company's mines—		
Mother Lode	104,120	
B. C.	1,345	
Emma	12,881	
Oro Denoro	6,404	
		124,750
Dominion Copper Co.'s mines—		
Brooklyn-Stemwinder	140,685	
Idaho	2,960	
Rawhide	26,032	
Sunset	48,390	
Mountain Rose	3,555	
		221,622
Snowshoe		8,426
Big Copper		586
High-grade properties—		
Providence	1,140	
Skylark	589	
Strathmore	140	
Nine smaller shippers.....	339	
		2,208
Total.....		1,158,996

The output of the B. C. Copper Company's mines was practically suspended during several months occupied in the reconstruction of the company's smelting works at Greenwood.

The tonnage of ore smelted at district smelters in 1906 was 1,276,589 tons (this including ores brought in from other districts) as compared with 982,877 in 1905. The proportions reduced at the several smelters were:

	Tons.
At Granby Company's smelter.....	338,847
" B. C. Copper Company's smelter...	121,031
" Dominion " " "	218,811
Total.....	1,276,589

All the copper matte produced was converted into blister

copper at the works of the Granby and B. C. Copper companies, respectively.

PRODUCTION IN JANUARY, 1907.

The quantity of ore produced by Kootenay and Boundary district mines during four weeks ended January 26, is shown by the Nelson *Daily News* to have been as under:

	Tons.
Slocan-Kootenay mines	8,094
Rossland mines	15,455
Boundary mines	48,256
Total.....	71,805

The ore receipts at the several smelters of these districts were:

Smelter of	Tons.
Consolidated Company, Trail.....	13,987
Le Roi Company, Northport.....	3,665
Hall M. and S. Company, Nelson.....	1,149
Sullivan Company, Marysville.....	2,400
Granby Company, Grand Forks.....	23,494
B. C. Copper Company, Greenwood.....	13,682
Dominion Copper Co., Boundary Falls.....	10,174
Total.....	68,551

GOLD COMMISSIONERS' NOTICES.

Notices have been gazetted by the gold commissioners of the respective divisions concerned that all placer mining claims legally held may be laid over, as stated below:

Mining Division.	From 1906.	To 1907.
Arrow Lake	Nov. 22	May 1
Ashcroft	Nov. 1	May 1
Atlin	Sept. 15	June 15
Cariboo	Nov. 1	June 1
Clinton	Nov. 1	May 1
Fort Steele	Sept. 18	June 1
Greenwood	Nov. 1	May 1
Kamloops	Nov. 1	May 1
Lillooet	Nov. 1	May 1
Nelson	Nov. 22	May 1
Nicola	Nov. 1	May 1
N. E. Kootenay.....	Nov. 1	June 1
Omineca	Nov. 1	June 15
Quesnel	Nov. 1	June 1
Similkameen	Nov. 1	May 1
Skeena	Oct. 15	June 1
Vernon	Nov. 20	May 1
Victoria	Nov. 1	June 15
Yale	Nov. 1	May 1

AN IMPROVED FRONT HEAD FOR AIR DRILLS.

James Petrie, master mechanic at the Le Roi Mine, Rossland, has patented a front head for air drills, which, the Rossland *Miner* states, promises to come into general use on account of its giving greater efficiency to the drill, by tapping the air with a double leather packing. The head of the drill is composed of three, instead of nine pieces, thereby diminishing the cost of maintenance to a considerable degree and also facilitating the repairing. Twenty-three of these heads are in operation in Rossland in the Le Roi Mine, and two at the White Bear. Trial orders have been received for four heads from the British Columbia Copper Company, operating in the Boundary. Three heads have been in operation since June 26, 1906, in the Le Roi, and have cost 30 cents each per month to maintain them. The old heads cost from \$6 to \$8 a month for maintenance. This is a large saving as an operative expenditure, and one which every mining company will fully appreciate. The heads, it is thought, are destined to come into universal use. They will fit any make of drill, including the Rand and the Sullivan. Mr. Petrie is negotiating for the sale of his patent.

BOOKS, ETC., RECEIVED.

California Gold Product, showing total production of gold in California in 1906. By Charles G. Yale, statistician.

California Gold Product, showing total production of gold in California in 1906. By Charles G. Yale, statistician.

California Gold Product, showing total production of gold in California in 1906. By Charles G. Yale, statistician.

Columbia University, New York City, U. S. A.—School of Mines Quarterly. Vol. XXVIII. No. 1, November, 1906.

Geographic Board of Canada.—Sixth Report of the Geographic Board, containing all decisions to June 30, 1906.

Geological Survey of Canada.—Annual Report (new series), Vol. XV., 1902-3. Accompanied by 21 maps and illustrated by a number of plates. Pages, with index, 1,133. By Dr. Robert Bell, acting director. The several parts composing the volume have been issued previously as separate reports, as completed.

Inland Revenue Department of Canada.—The Metric System of Weights and Measures. An outline of its principles, together with some notes upon its advantages over the British standards. Issued under the direction of the Minister of Inland Revenue.

Imperial Institute, London, England.—Bulletin of the Imperial Institute. Vol. IV., No. 3, 1906.

Papers by Reginald A. Daly, Ottawa, Ontario.—(1) The Differentiation of a Secondary Magma through Gravitative Adjustment. (2) The Nomenclature of the North American Cordillera between the 47th and 53rd Parallels of Latitude (From The Geographic Journal for June, 1906). (3) The Okanagan Composite Batholith of the Cascade Mountain System (Bulletin of the Geological Society of America, Vol. 17, pp. 329-376). (4) Abyssal Igneous Injection as a Causal Condition and as an Effect of Mountain-Building (From the American Journal of Science, Vol. XXII, September, 1906). These papers have been published by permission of the Canadian Commissioner, International Boundary Surveys.

BOOKS REVIEWED.

After Earthquake and Fire.—A reprint of the articles and editorial comment, appearing in the *Mining and Scientific Press* immediately after the disaster at San Francisco, California, U. S. A., on April 18, 1906. Published by the *Mining and Scientific Press*, San Francisco. Pages, 1904. Octavo. Price, \$1.

This book contains scientific articles on the Earthquake itself and others on the effects of the fire which added greatly to the destruction of San Francisco. The editor, T. A. Rickard, states that it commemorates an experience the *Mining and Scientific Press* shared with its neighbours in San Francisco, and is a tribute to the loyalty of that journal's staff and to the goodwill of its friends. He expresses the opinion that the collection of articles reprinted should have a scientific value and in days to come serve as an interesting record. Those who read the book will find in it much of interest, not only in the particulars of a disaster without parallel on the North American continent, but as well in the scientific information and data also comprised in its pages. The book is handsomely illustrated, the letter press excellent, and the price moderate.

Lead Smelting and Refining, with some notes on Lead Mining. Edited by W. R. Ingalls, editor of *The Engineering and Mining Journal*, New York. Pages, 321. Octavo cloth, freely illustrated, including numerous diagrams and drawings. Price \$3. postpaid.

This book comprises a collection of important articles on Lead Smelting and Refining by eminent authorities, reprinted from the numerous contributions on the subject which have appeared in *The Engineering and Mining Journal* during

recent years. The present compilation concentrates in compact form much literature applying to the industry, and also incorporates elaborate descriptions and accounts of the new processes of lime-roasting, including the Huntington-Heberlein, the Carmichael-Bradford and the Sayvelberg experiments. The volume is up-to-date in detail and conveys comprehensively the progress and advancement made in other branches of lead smelting that have been developed in the recent past. It embodies valuable information that will materially assist the lead smelter when perplexing problems confront him. Altogether the treatise will prove of great practical utility to smelters and metallurgists.

The Cruise of the "Neptune."—This is a Report of the Dominion Government Expedition to Hudson Bay and the Arctic Islands on board the D. G. S. "Neptune" in 1903-4, by A. P. Low, B. Sc., F. R. G. S. An idea of its scope will be conveyed by the following narration of the titles of its various chapters, which are: I, Voyage to the Bay; II, Winter Quarters at Fullerton; III, Summer Cruise of the "Neptune"; IV, Historical Summary; V, Arctic Islands; VI, and VII, Eskimos; VIII and IX, Geology; X, Whaling; and XI, Navigation of Hudson Bay. Appendices give meteorological observations taken; information relative to birds, eggs, plants, and fossils collected; notes on the physical condition of the Eskimos, etc. The book contains 345 pages and an index; it is octavo cloth, and has numerous half-tone illustrations of scenery, native peoples, and other subjects dealt with in the letter press, together with a map of the regions visited. The volume was issued under the auspices of the Department of Marine and Fisheries, Ottawa, Ontario.

*OBITUARY.

Charles A. R. Lambly, Provincial Government agent and gold commissioner at Fairview, Okanagan, died on January 29, having succumbed to an attack of pneumonia. Arrangements for the funeral, which took place at Vernon two days later, were made by the A. F. and A. M., of which craft he had been a member. The burial service of the Church of England was conducted by Rev. J. H. Lamberton.

The late Mr. Lambly was born in Megantic county, Quebec, on May 14, 1852, of English parents. Later he resided in Bothwell, Ontario, where he was articled to a civil engineer. After several years engaged in railway engineering he left Ontario, in 1878, for British Columbia, going via San Francisco. For 10 years after his arrival in this Province he was employed chiefly in railway survey work, examining proposed routes along the Skeena, Peace, Fraser, and other western rivers. When construction of the Shuswap & Okanagan railway was commenced he removed to the upper Okanagan where, at Enderby, his brothers Thomas and Robert were ranching. Shortly afterward he entered the Provincial Government service, first as assessor and afterward as mining recorder, gold commissioner, stipendiary magistrate and Government agent. In this service he was stationed successively at Enderby, Rock Creek, Camp McKinney, Osoyoos and Fairview, most of the time at the latter two places, going to Fairview from Osoyoos in 1899. He held a commission of justice of the peace when only 27 years of age.

In 1897 he married Miss Hester Haynes, eldest daughter of the late Judge Haynes of Osoyoos. Beside his widow he leaves two children, the eldest about 9 years old and the youngest an infant in arms.

He was a Freemason of some 30 years standing, having become a member of the craft in 1877, and was one of the charter members of Enderby lodge. He was a gunner in the artillery at New Westminster, in the early eighties.

It was, though, in his official capacity, during his long and efficient service for the Government in the Osoyoos district, that he was best known, and very few could have filled the position with the skill and judgment which he displayed.—*Hedley Gazette*.

MINING MEN AND AFFAIRS.

Alex. Grant, manager of the Marble Bay mine, Texada Island, was in Victoria recently.

A. A. Watson has removed from Olalla, Similkameen, to Cobalt, Ontario.

Oscar W. Erdal, for the last two years surveyor for the Alaska Treadwell Gold Mining Company, Alaska, died on January 28.

B. P. Little, manager of the Diamond Vale Coal and Iron Company's properties in the Nicola district, was a recent visitor to the Coast.

A large deposit of marble of excellent quality is reported to have been discovered near Mt. Cheam, eight miles from Chilliwack.

R. S. Robinson, late manager for the Slocan-Cariboo Mining and Development Company, has left the Cariboo district for Puget Sound, Washington, U. S. A.

H. C. Bellinger is stated to have been engaged to supervise the construction of a smelter in the Greenwater district, California, U. S. A.

H. Harris, who lately resigned as superintendent of the Hall Mining and Smelting Company's smelter at Nelson, will probably shortly go to Mexico.

Selwyn G. Blaylock, for several years at the Canadian Smelting Works, Trail, has succeeded H. Harris as superintendent of the smelter at Nelson.

Lewis Stockett, manager of the Pacific Coal Company's colliery at Bankhead, near Banff, Alberta, visited several mines in West Kootenay early in January.

Anthony J. McMillan, managing director of the Le Roi Mining Company, is expected to remain several months in Rossland after his arrival there from London in February.

W. W. B. McInnes has resigned the post of commissioner for Yukon Territory. Ralph Smith, M. P. for Nanaimo district, is mentioned as his probable successor.

George H. Aylard, part owner and manager of the Standard mine, Slocan, has examined the Queen Victoria mining property situated at Beasley siding, near Nelson.

J. P. Couldrey, brother of the manager of the Le Roi No. 2, has left Rossland in company with R. L. Wright for Goldfield, Nevada, U. S. A.

George Huston, well known throughout the Slocan as a newspaper writer on mining matters, is now employed at a smelter at Mullan, Idaho, U. S. A.

J. M. Ruffner, general manager of the Pine Creek Power Company and the North Columbia Gold Mining Company, Atlin, paid a business visit to Victoria during the month.

Robert R. Hedley has resigned as manager of the smelting works of the Hall Mining and Smelting Company, Ltd., at Nelson British Columbia.

A. G. Larson, superintendent of the Le Roi mine, Rossland, went to Goldfield, Nevada, during January to attend the funeral of his brother, who died there recently.

Melbourne Bailey, manager of the Cariboo Consolidated Company's deep-drift gold mine at La Fontaine, Lightning Creek, has returned to the mine after having spent several weeks on the Coast.

J. B. Hobson, of Bullion, Cariboo, where he is manager for the Guggenheim companies operating near Quesnel Forks, has gone to New York, where are the headquarters of his principals.

Edmund B. Kirby, formerly manager of the Centre Star and War Eagle mines at Rossland but now a consulting mining engineer and metallurgist, has his office at St. Louis, Missouri, U. S. A.

Lewis Hind is spending the winter with his family in Victoria. He will resume work on the Slocan mining properties he has been operating as soon as the snow shall have sufficiently lessened to admit of his doing so.

C. D. Dunlop, of New Westminster, has been appointed an inspector of steam boilers and machinery under the provisions of the "Steam Boilers Inspection Act" during the absence of Inspector Thomas Goldie.

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Monte M. Johnson, of San Francisco, Cal., U. S. A., who in the capacity of consulting engineer for the Copper Company, has been in charge of the development of the property, will probably go to the Ontario mine.

H. W. Turner, consulting engineer at Portland, Ore., is the writer of an article on mines on Prince of Wales Island, southeast Alaska, and has returned from the island, having secured considerable results from a visit to the island.

George W. Grayson, of San Francisco, California, has been appointed superintendent of the development of the Prince of Wales Island, southeast Alaska, and is now in charge of the development of the Cuprite Copper Company's property, also on the island.

E. T. Henshaw, of Henshaw Bros., New York, is largely interested in the McKee Consolidated and Amalgamated McKee Creek hydraulic gold mining companies, was in Victoria early in January on his return from a visit to the island.

Certificates of efficiency as assayers have been issued by the Provincial Minister of Mines, under the "Bureau of Mines Act Amendment Act, 1899," to the following gentlemen who last month passed the requisite examination: S. E. Belt, P. Bernard, L. H. Cole, J. J. Fingland, George R. Kiddie, H. J. Marshall, Alex. C. MacDonald, and George G. West.

Bertram Mellon has resigned charge of the operations of the Slough Creek, Ltd., at its deep-drift gold mine, Cariboo, and is proceeding to New Zealand on a trip through the mining districts of that country before returning to England. His successor at the Slough Creek mine is H. H. Water, who recently arrived from England.

James R. Brown, mining recorder at Fairview, Okanagan, will temporarily perform the duties of gold commissioner for the Okanagan mining division consequent upon the death of

Prietos, Sonora, Mexico, has removed to Comptonville, California, U. S. A.

Gustavo Sundberg, for several years chief chemist and assayer at the Prince of Wales Island, Alaska, has taken over from Charles W. Carpenter & Company, assayers and chemists, their Mexico City business.

J. L. Parker, at one time manager of the North Star mine, East Kootenay, and for the last two years manager for the Prince of Wales Island, southeast Alaska, and P.

British Columbia, has retired from the latter position and opened an office at Seattle, Washington, as a consulting mining engineer.

Horace G. Nichols has been appointed manager of the Ymir gold mine at Ymir in Nelson mining division, and is expected to arrive at the mine during February. Mr. Nichols was with the Ymir company at the inception of its gold milling operations. He left Ymir in 1899 and afterwards was with R. Gilman Brown, consulting engineer, first for four years in California and later at the Aramecina mines in Central America.

J. E. Harrington, secretary of the Canadian Metal Company and one of its directors, is expected to reach Nelson about the middle of February, when he will discuss with the manager, S. S. Fowler, matters connected with the company's zinc smelter at Frank and Blue Bell mine at Ainsworth. At the latter development is being continued with satisfactory results and the construction of the concentrating plant is being proceeded with.

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SYNOPSIS OF CANADIAN HOMESTEAD REGULATIONS.

Any available Dominion Lands within the Railway Belt in British Columbia, may be homesteaded by any person who is the sole head of a family, or any male over 18 years of age, to the extent of one-quarter section of 160 acres, more or less.

Entry must be made personally at the local land office for the district in which the land is situate.

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(2) If the father (or mother, if the father is deceased), of the homesteader resides upon a farm in the vicinity of the land entered for, the requirements as to residence may be satisfied by such person residing with the father or mother.

(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

Six months' notice in writing should be given to the Commissioner of Dominion Lands at Ottawa of intention to apply for patent.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2000 lbs. shall be collected on the gross output.

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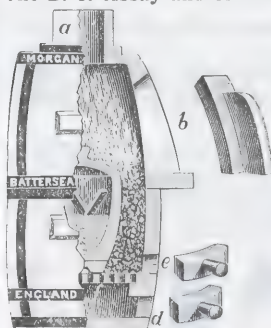
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 Rates on page 10.

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NOTES AND COMMENTS.

Two companies are actively engaged in developing coal properties in the Nicola district.

Hydraulic mining under favourable conditions is the cheapest method of gold mining known.

The diamond drill work at the B. C. mine in Summit Camp, Boundary district, has revealed the presence of additional ore bodies.

"Coal is mighty but does not prevail," observed the Greenwood *Ledge* during a recent period of scarcity of that fuel in the Boundary district.

On February 25 Ralph Smith, M. P., addressed the members of the Canadian Club in Ottawa on the subject of "Proper Relations Between Labour and Capital."

The British Columbia Copper Company has leased the Morrison mine, situated in the same camp as its Mother Lode mine. Morrison ore, having a high sulphur content, is required at the company's smelter.

At the Crescent mine, near Greenwood, no breaks in the vein have occurred from the surface to the present depth, 240 ft., which the *Boundary Creek Times* claims "is something to brag of in Greenwood camp."

Ore is being taken out of the Providence mine, north of the porphyry dyke at the 300-ft. level. The Greenwood *Ledge* remarks that this is the first ore encountered north of the dyke, and may prove continuous.

The Daly Reduction Company at Hedley is looking for more Princeton coal, being anxious to secure some 500 tons immediately, but owing to the condition of the road the *Similkameen Star* thinks it is not likely to get it.

Tenders are called for moving from Ashcroft 113,000 lb. of freight for Quesnel dam. This will be mostly hay and grain and is the first move towards the commencement of an extra busy season at Cariboo's big hydraulic mine.

The managements of several Slovan mines—the Surprise, Last Chance and American Boy—are stated to have boycotted Sandon owing to the antagonistic attitude of the local miners' union towards the employment of Chinese cooks in the Slovan.

Two ore shoots of considerable size and of good grade have been located on the 800-ft. level of the White Bear mine, Rossland. The management is much pleased over these finds and feels confident that the White Bear will yet develop into a valuable mine.

The Ashcroft *Journal* is of opinion that everything indicates that this season will see a large number of men in the hills hunting for copper ore. The development and strikes of last season have attracted attention to the Ashcroft district as one of the promising copper areas of the province.

‘The Prince Henry has passed the speculative point in mining,’ states the *Boundary Creek Times*. ‘At 200-ft. depth the vein has straightened up and the ore is now 6 to 8 in. wide and solid.’ This property is one of the most promising of the Boundary high-grade silver-gold mines.

It is reported that the smelter buildings at Pilot Bay are to be taken down and as much as possible of the material in them will be used at the Blue Bell mine, situated a few miles higher up Kootenay Lake. The construction of a 250-ton concentrating mill at the Blue Bell should shortly be making good progress.

The Dominion Copper Company is doing some underground prospecting on its Crown Silver claim, which adjoins the Mother Lode in Deadwood camp. No work had been done on this property for several years, not since the Montreal & Boston Copper Company sank a shaft 262 ft. and opened levels at 150 and 250 ft. depth.

‘With the approach of spring there will be an inflow of miners and prospectors to Southeast Kootenay,’ is a prognostication of the Cranbrook *Prospector*, which says further: ‘The fame of this section has gone abroad, and mining men who keep in touch with the development of the different mining camps of this district will come here.’

February 16 was pay day for January at the collieries of the Crow's Nest Pass Coal Company, and the largest amount in the history of the company with the exception of the months of June and August, 1906, was paid to the employees in the following proportions: Coal Creek, \$96,862.30; Michel, \$53,254.90. Total, \$150,117.20.

Recently the Queen Victoria mine near Beasley siding, seven miles west of Nelson, made its first shipment since the purchase of the property by James

Cronin and associates. The ore was sent to the Consolidated Company's smelter at Trail. An aerial tramway, 2,500 ft. in length, has been constructed for the purpose of transporting the ore from the mine to the railway.

The shaft of the Prince Henry, one of the small high-grade mines near Greenwood, has been deepened to 225 ft. and drifting at that level commenced. The pay streak is 6 to 8 in. wide and the ore assays up to \$200 to the ton. On the E. P. U., another of the Boundary high-grade properties, a cross-cut, already in 65 ft., is being driven from the end of the 320-ft. adit previously put in.

The Northport smelter resumed operations on February 28, after a shutdown of several weeks, says the *Rossland Miner*. For some days coke has been coming in from Fernie, and now there is large enough a supply to keep the furnaces in operation for a considerable period. The management feels confident that there will be no cessation of operations for a considerable period, unless the unexpected happens.

The *Slovan Mining Review* calls attention to the fact that the ‘misleading advertising’ of the British-American Copper Mines and Smelter Company, some of the published misstatements of which the *MINING RECORD* last month exposed, has since been advertising its ‘absolutely false statements’ in the *Vancouver World*, and suggests that ‘this is a good case for the post office authorities to investigate, and that without delay.’

The Dominion of Canada *Labour Gazette* says: It was stated by the general secretary of the Lord's Day Alliance that a number of leading mining firms in British Columbia were engaged in erecting and improving the bunk houses of the men in view of the fact that Sunday labour along general lines is now prohibited and the necessity of the men having more sanitary and more pleasing Sunday quarters is thereby emphasized.

The ore-loading arrangements provided at the shipping point for the Mt. Andrew mine, situated on Prince of Wales Island, southeast Alaska, are described as the best yet made in Alaska. The present full capacity of the aerial tramway from the mine to tide-water is only 200 tons per day, but there is ore-bin storage capacity for 3,000 tons, which quantity, with the aid of the loading devices above alluded to, could, it is claimed, be loaded for shipment in about eight hours.

The *Anaconda News* has reported the discovery of a 2-ft. vein of galena ore on the Ruby fraction claim near Boundary Falls. This discovery is regarded as of importance for the reason that no high-grade silver ore had previously been known to occur so far south along Boundary Creek. Three or four miles south-east, on the Kettle River slope of the Boundary

mountain range, galena occurs in the City of Parn-
mine, but none had previously been found beyond
Boundary Falls and Anacostia on the eastern side of
Boundary Creek.

At the Lone Star and Washington mine, Boundary
district, a short distance south of the International
boundary line, a force of 16 men is steadily employed
by the British Columbia Copper Company. Con-
siderable development work has been done, with very
satisfactory results. More than 400 tons of ore have
been shipped from the property to date, the ore hav-
ing been hauled a distance of four and one-half miles
by horse teams to a siding on the Kettle River rail-
way, near Danville, Washington, and taken thence by
rail to the company's smelter at Greenwood.

The following press despatch has been sent out
from Vancouver: A fine body of ore has been struck
in the Copper Queen, Texada Island. Mr. Cox, of
Seattle, and associates are now working the Copper
Queen under a bond, with promising results. What
makes the find remarkable and most promising is that
it dips towards the Marble Bay lead. In the 800-ft.
level of the Marble Bay mine, the lead changed from
the southwest to the southeast, a most remarkable
fact, which was contemplated by none of the numer-
ous experts who have examined the mine. The lead
continues to produce a fine body of ore.

Mail advices from Whitehorse, Yukon Territory,
say: The Yukon will during 1907 have the best
season in its history. If only half the number of
dredges ordered arrive the output of gold will be
enormous. It is expected, though, that all the dredges
ordered will be here in time to begin operations in
the spring. It is understood the Guggenheims of
New York will order additional dredges for working
on their placer grounds. Conditions in the Yukon
are now such that there is little use in continuing
primitive gravel-washing methods, consequently the
era of the gold dredge has set in.

The following is from the *Nelson Canadian*:
Most welcome news is that of the reconstruction of
the Ymir Mines Company and the securing of ample
capital for development and operation on a large
scale. The Ymir mine was handicapped for many
successive years by frequent changes of management
and uncertainty of the policy of the directors. The
discovery of large new ore-bodies requiring consider-
able capital to open and develop them made recon-
struction imperative. This has now been perfected
and H. G. Nichols, the new manager, announces that
he will begin work in March with a clean sheet.

The Nanaimo, B. C., correspondent of the *Domini-
on of Canada Labour Gazette* has reported to that
journal that a bonus of five per cent. on the gross
earnings of its employees during January was granted
by the Western Fuel Company of Nanaimo. From
February 1, the bonus amounted to 10 per cent., and

is to remain at that rate while present conditions in
the coal trade continue. The Wellington Colliery
company paid all its men of 19 per cent. from
January 15. The increase amounts to about \$1.50
per week in the case of drivers and labourers, \$1.50
per week in that of skilled artisans, and about \$2 per
week to miners on contract work.

"Extensive repairs have been going on in the Daly
Reduction Company's stamp mill, getting ready for
the resumption of work a few weeks hence, when
water becomes more plentiful," says the *Hedley Ga-
zette*. "Last year the mill and works generally were
allowed to run down, little or no attention having
been given to keeping things in a state of repair.
The severity of the weather this winter, which neces-
sitated the temporary shut-down, afforded an oppor-
tunity of rectifying matters, and not an hour has been
lost in having the works thoroughly overhauled and
put in better running shape to commence work as
soon as the power is turned on."

Shareholders in the Rosella Hydraulic Mining and
Development Company, which during two or three
recent working seasons has been endeavouring to get
into shape for profitable hydraulic mining its placer
gold claims situated in northeastern Cassiar, were
lately informed at a meeting held at Nanaimo that:
"In 1906, shortage of water was largely responsible
for the small returns. This condition cannot occur
in 1907, for two reasons: First, the construction of
a reservoir, which was completed last season. Sec-
ond, the very heavy fall of snow this winter. Share-
holders can therefore look with confidence for large
returns at the end of 1907."

The Kamloops *Standard* states that the Ten-
derfoot Mining Company's property at Copper Creek
has been bonded to Henry Croft and H. G. Ashby,
and so far as is possible, until an examination has
been made of the property by Mr. Croft, the deal is
closed. Mr. Croft will be in Kamloops by the middle
of April, and if, after examination, he confirms pre-
liminary reports, the cash will be paid on or before
May 10 next. Arrangements will also be made dur-
ing Mr. Croft's visit for the reopening of the Pot
Hook property, for which purpose he has been suc-
cessful in securing working capital to an amount
which will insure development for some time.

After mentioning the recent visit of the vice-
president of a dredge-building company to Big Bar,
Fraser River, and stating that the object of his visit
was to arrange for the installation of two gold
dredges, the *Ashcroft Journal* remarks: This inti-
mation of an intention to place a dredge to work on
these leases is the first assurance that the boring
operations conducted last year by the Burns syndi-
cate's engineer, W. Kirkwood, have turned out well.
Of course it was taken for granted that everything
was all right, for all the indications pointed that way,
still the fact that the syndicate is ready to build

dredges shows that the result of the tests of last summer must have been very satisfactory.

Wishing to ascertain authoritatively the purport of the United States treasury ruling *re* duties on zinc, the Nelson *Daily News* telegraphed the secretary of the treasury at Washington for the full text of the new ruling. The following reply was received: Decision relative to calamine and other zinc ores covers four and one-half pages and is to effect that carbonate and silicate of zinc are duty free as "calamine" under paragraph 514 of the Act of 1897, and sulphide of zinc is free of duty under paragraph 614 of said Act except as to lead contents thereof, which are dutiable at the rate of one and one-half cent per lb. under paragraph 180 of said Act. Appeal has been taken from said decision. Copy of decision and tariff mailed you today.

George F. Beardsley, acting manager for the British Columbia Copper Company in the absence on sick leave of the manager, J. E. McAllister, has been reported in the press to have said: The British Columbia Copper Company's mines are yielding about 17½ per cent. of copper, two of the properties going higher, out of which is recovered 85 per cent. of this metal. The company is selling (in February) its blister copper at 32 cents a lb., 8 cents of this being represented by other than copper values. The old costs of smelting and mining were placed at \$3.50 a ton, but these have been materially cut down by the recent improvements, a profit of \$4 to \$5 gross being now made on each ton of ore.

The president of the Kamloops board of trade, in his annual report, made the following reference to mining in that district last year: While there has not been that progress made in mining circles that we had every reason to expect, it is encouraging to note that outside capital, from entirely new sources, has shown signs of becoming actively interested in the development of our extensive copper ore deposits. Consequent to the desultory and intermittent manner in which the ore-producing mines of the district have been conducted during the past 12 months, the ore shipments showed a reduction from the previous year, those for 1905 having been 343 cars, while in 1906 the shipments aggregated only 128 cars. There is reason to believe, though, that the shipments this year will put last year's figures entirely in the shade.

From a report of the meeting published in the Nelson *Canadian* it is learned that the Nelson board of trade, in a short and very business-like meeting, recently adopted a resolution condemning the proposal to reduce the duty on lead ore and lead products put forward by the paint manufacturers of eastern Canada. The resolution read: "That it is the sense of this meeting that it is unwise to permit any alteration in the tariff on lead and lead products." It was agreed that copies of the following telegram should be sent to several members of the Federal Govern-

ment and Messrs. Gallihier and Ross, M. P.'s: "The Nelson board of trade strongly opposes any reduction of the duty on lead ore and lead products. Any disturbance of confidence already created by the Government respecting the industry would produce serious results." The secretary was instructed to also wire the boards of trade of Kaslo, Rossland, Trail, Fort Steele, Moyie and Cranbrook.

At no other time since it began smelting at its works at Ladysmith, Vancouver Island, has the Tyee Copper Company received such comparatively large supplies of custom ore as at present. This is due largely to its long-continued and persistent enterprise in seeking to purchase such ore, for it has during several consecutive years constantly kept a capable ore-buyer moving among prospective producers, not only along the coast of British Columbia but northward into Yukon Territory and Alaska. One result, among others, of this advanced policy is shown in the following report of statements made by Charles A. Sulzer, general manager of the Alaska Industrial Company, owning copper mines situated on Prince of Wales Island, who returned north about the middle of February. He said: "The steamer 'Haldis' will bring south between 2,600 and 2,800 tons of ore, and for the next few months the Alaska Industrial Company will ship to the Ladysmith smelter about 1,000 tons monthly. We are now equipping the mines with power drills and making preparations for more extensive development than has been carried on in the past. Within a few months the mines will be producing shipping ore at the rate of about 3,000 tons per month. All this ore will be treated at the Ladysmith smelter."

At the deep-drift mine of the Slough Creek, Ltd., drifting in bedrock and tapping the gravel at various points was carried on at intervals during 1906, but only as much work of this nature was done as was necessary to maintain an outflow of water from the gravel sufficient to keep both pumps running at from 70 to 80 per cent. of their capacity. The greater part of the year was occupied in doing construction work. A water lodgment, having a capacity of about 60,000 gal., was driven below the level of the main tunnel and connected to the original sump. The old drain tunnel commencing some 2,000 ft. down the valley and connecting with the gravel shaft, was repaired and retimbered and the tunnel extended upstream for about 260 ft. Pumping at the rate of from 7,000,000 to 8,000,000 gal. per week was steadily maintained throughout the year. In order to increase the outflow, it is proposed to elevate water with bailing tanks. Two additional steam boilers and a pair of 16 by 44-in. direct-acting winding engines are being installed. The various works attending this increase of plant are almost completed. From 20 to 30 men have been regularly employed, and about 60 Chinamen were at work during the fall cutting fuel for the ensuing year's supply.

SOME NOTES ON THE ECONOMIC GEOLOGY OF THE SKEENA RIVER

By W. A. Leach.

SKEENA RIVER DISTRICT is continuing to receive attention from many people throughout it to become an important, important part of British Columbia after it shall have been provided with adequate transportation facilities. The following paper on its economic geology has been, with the permission of the director of the Geological Survey of Canada, prepared by Mr. Leach (of the Survey geological staff), who spent the field-work season of last year in the district under notice, for submission to the annual meeting of the Canadian Mining Institute, the secretary of which has courteously supplied the *MINING RECORD* with an advance copy of the paper:

Since the Grand Trunk Pacific railway scheme was first projected, a great deal of interest has been aroused in the potentialities of the country through which this road will pass. Up to the present, however, the attention of the public has been turned chiefly to the eastern and prairie sections, the uncertainty of the route through the mountainous districts of British Columbia having deterred many from exploring that part of the country in the hope of locating valuable minerals, lands and timber in advance of the railroad.

At the present time it seems fairly definitely settled that the road will pass down at least part of the Skeena Valley, and during the past two seasons a number of prospectors have found their way into that district, many coal and mineral claims have been staked, and a great deal of the available arable land taken up.

Although this was one of the first parts of British Columbia to be traversed by the earlier explorers, Sir Alexander Mackenzie having crossed from the Peace River to Bella Coola on the Pacific (passing a short distance south of the Skeena waters) as early as 1793, very little is yet known of the economic geology of the region. The only official reports, known to the writer, dealing with this subject are those by Dr. Dawson, contained in the "Report of Progress of the Geological Survey" for the years 1879-80, and by Mr. William Fleet Robertson, the British Columbia provincial mineralogist (see "Report of Minister of Mines, B. C., 1905"). Dr. Dawson's work consisted of a hurried exploration from Port Simpson to Edmonton, following the main travelled trails and, with the map accompanying it, affords the only reliable information of much of this country today. Mr. Robertson's report, as far as geology is concerned, deals chiefly with a number of prospects in and adjacent to the Bulkley Valley.

Up to the last few years little or no prospecting

has been done in this great district, if we except the placer miners, who have over-run the greater part of it pretty thoroughly but without any very startling results.

The rocks of the Skeena River may be roughly divided into four main divisions to which, in their southern continuation in the neighbourhood of Francois Lake, Dr. Dawson has applied the following nomenclature beginning at the oldest: 1st, the Cascade Crystalline series; 2nd, the Cache Creek group; 3rd, the Porphyrite group; and, 4th, rocks of Tertiary age.

The Cascade Crystalline series extends in a belt along the coast and is crossed, more or less at right angles, by the river, and has here a width of 50 to 60 miles. These rocks consist chiefly of gneisses, granitic rocks and micaceous schists, generally much disturbed and usually found dipping at high angles; they are supposed to be of Palaeozoic age probably Carboniferous or older. Up to the present they have not been found to contain many large or valuable mineral deposits, although various minerals of economic value have been reported as occurring in these rocks at different localities in this neighbourhood, notably, pyrrhotite and chalcopyrite on the Tsimpian Peninsula back of Port Simpson, galena and copper pyrites at the head of Kitamat Arm, and iron ore on the Eestall River near Port Essington. It is highly probable, however, that future prospecting will bring to light other occurrences of valuable minerals, as the extremely wet climate of the coast region, with the resultant rank growth of underbrush and heavy covering of moss has deterred many from prospecting this part of the district with any degree of thoroughness. The mountains here, besides, are high and rugged with few trails and less feed, so that the more open country and better climate of the interior has up to the present gained most of the attention.

Of the Cache Creek series little can be said; the rocks composing it are chiefly quartzites, dark highly-altered argillites and crystalline limestone and are supposed to be Carboniferous, though no fossils have been found in them in this region, and this classification must be regarded as only provisional. Their extent is very doubtful and they do not appear to outcrop in the Skeena Valley itself, at least as far up as Kispiox; the only locality in the lower part of the Skeena watershed where these rocks were noted being on the Kitsequela River, a few miles above its mouth. On the upper Skeena they appear to be more largely represented as they crop continuously along the river from near the fourth telegraph cabin to the mouth of Bear River and beyond. The writer is not aware of any claims having been located in these rocks.

The third of these divisions, the Porphyrite group, covers by far the most extensive area, and is also of most interest to mining men, inasmuch as practically all the recent discoveries of mineral occur in this formation, while the coal-measures may, for the pres-

ent at least, be also included. These rocks are probably of Cretaceous age and vary greatly in composition and appearance throughout the district. While named by Dr. Dawson the "Porphyrite group" on account of the preponderance of that rock in the Francois Lake district, to the south of the part in question at present, still rocks of volcanic origin are by no means the only ones represented, there apparently having been a gradual change from south to north from beds mainly of volcanic materials to those of purely aqueous deposition.

In and adjacent to the Bulkley Valley these rocks cover a great area, and have been studied in more detail than elsewhere, having been prospected more or less thoroughly and numerous claims located on them. Here volcanic rocks are much in evidence, consisting of porphyrites (andesites), tuffs, agglomerates, etc., often highly amygdaloidal with inclusions of calcite, zeolites, epidote, etc., more often occurring in sheets as volcanic flows, but frequently showing evidences of deposition under water, and all more or less regularly bedded. They vary greatly in texture and appearance, in colour ranging from light greenish greys to dark purplish reds. Dr. Dawson has estimated their thickness, south of Francois Lake, at about 10,000 ft., and while of necessity this will vary greatly, in the neighbourhood of the Bulkley Valley it will probably not fall far short of this.

These volcanics have been cut in various places by intrusive granitic areas which have shattered and metamorphosed them to a great extent. It is along the contacts of these intrusive rocks and the numerous dykes from them with the porphyrites that mineralization has most frequently taken place. The granitic rocks themselves are somewhat variable in appearance, two distinct facies having been noted on the Telkwa River, one consisting of a coarse light-coloured biotite granite shading off into a granitic porphyry near its edges, and the other of a pinkish syenite porphyry; both, however, seem to have had the same effect in regard to mineralization. The dykes from them show an indefinite number of types.

In the vicinity of the Bulkley there would appear to be, so far as is known, three main mineral-bearing belts, the most important so far being situated on the Telkwa River near its head, crossing over into the headwaters of the Morice River. The other two have not been visited by the writer, but from description of prospectors and others conditions must be very similar to those on the Telkwa. One of these lies at the head of the Zymoetz or Copper River including Hudson Bay Mountain, and the other is located on the Babine Range between the Bulkley and Babine Lake, near the headwaters of Driftwood Creek. These two latter districts differ from the first-named inasmuch as a number of galena leads have been located in them, whereas on the Telkwa district that mineral is seldom seen.

On the Telkwa River the ores consist chiefly of copper, and occur in a variety of ways. At times they are found occupying fissures where the country rock has been shattered near the intrusive granitic

rocks; this is particularly noticeable in Hunter's Basin at the head of Goat Creek. Replacement along crushed zones is another common form of ore deposition, and again in places the later dykes themselves are mineralized, and in other cases, although the dykes appear to be barren, the porphyrites along their contacts are mineralized; one such case, that of the Black Jack and Dominion claims in Dominion Basin, which came under the writer's notice, showed a strong dyke about 45 ft. wide cutting nearly vertically the porphyrites, themselves dipping at low angles. The brown trap of the dyke seemed to be quite barren, but in certain beds of the volcanics, which were more readily decomposed than others, the country rock had been replaced by quartz, calcite, epidote and ore, which alteration appears to have followed the bedding planes, reaching its maximum intensity near the walls of the dyke and gradually decreasing laterally from them.

It will be seen from the above that uniformity in the manner of ore deposition is not to be looked for; probably the most common form is when the large dykes are themselves mineralized, especially along their walls. In such instances the adjacent porphyrites are in most cases themselves decomposed in part and more or less mineral-bearing.

Practically no work has been done on any of the Telkwa River properties beyond mere surface prospecting, and that to a very limited extent only, so that it is much too early to prophecy as to their continuity and ultimate value. In some of the small fissures high-grade ore is found with values chiefly in silver and copper (the gold contents as a rule being small), the ore consisting of a variable mixture of chalcopyrite, chalcocite, copper carbonates, bornite, and specular iron, the latter at times being highly micaceous. This micaceous iron seems in places to be associated with silver, as a sample of it, carefully separated from the other materials, gave by assay 8 oz. of silver to the ton. The gangue is usually quartz. The following are a few of the most typical claims of this class, the Rainbow, King, Wareseco, Idaho, and Russell, all in Hunter's Basin.

It is, however, mainly on the larger and lower grade properties that the future of the district will depend. The most common ore in these is a mixture of chalcopyrite, a little chalcocite, specular iron and iron pyrites in a gangue consisting of quartz, altered country rock, epidote, calcite, etc., which should make a nearly self-fluxing ore. Among the principal claims of this description may be mentioned the Duchess, Evening, and Anna-Eva groups, all on Howson Creek, and the Dominion and Black Jack claims of Dominion Basin.

As a general rule it may be said that, although the greater part of this district is underlain by rocks of the Porphyrite group, no important discoveries of mineral have been made except in the immediate vicinity of the granitic intrusions and the dykes from them, and it would therefore appear conclusive that they were instrumental in the deposition of such ore as has so far been found.

COAL.

Coal has been reported from many widely separated localities in the Skeena watershed, in fact it was known and locations taken up some time before the existence of the metalliferous deposits was noted. To give an idea of the widespread distribution of coal the following localities may be mentioned where it has been found: the lower part of the Telkwa River and its tributaries, the headwaters of the northern branches of the Morice River, the Bulkley River from near its junction with the Morice River to the mouth of Sharp Creek, about 12 miles below Moricetown, Driftwood Creek, the Kitsequella River near its mouth, the lower end of the Kispiox River, Tzeatzakwa River, the head of Copper River, and near the head of the Skeena River itself.

In not all of these localities have workable seams been found, but it is of interest to note the presence of the coal-bearing rocks with the possibility of future work showing up other and better seams in some places at least.

It seems probable that all these coals are at about the same geological horizon, and are of Cretaceous age, though, towards the south, Tertiary coals may be represented contemporaneously with some of the volcanic flow rocks there found, which are in all probability younger than those of the Porphyritic series.

Besides being widely distributed throughout the district, coals differing greatly in quality have been found, as a glance at the following analyses will show:

No.	Remarks.	Moisture.	Volatile Combustible Matter.	Fixed Carbon.	Ash.
—Per cent.—					
1—2-ft seam, Driftwood Creek, does not coke		7.00	36.64	42.00	13.40
2—2-ft seam, Bulkley River near mouth of Sharp Creek, cokes well		1.02	25.70	73.00	1.28
3—Top seam, 10 ft., Cassiar Coal Co., Goat Creek, non-coking, sulphur, 0.52 per cent.		3.40	28.80	62.00	5.80
4—6-ft. seam, Transcontinental Exploration Syndicate, Goat Creek, non-coking, sulphur 0.52 per cent.		0.90	9.90	75.80	13.40
5—6 ft seam, Western Development Co., head of Skeena River, non-coking		5.75	7.34	75.00	11.91
6—4-ft seam, Telkwa Mining and Development Co., head of Morice River, non-coking		6.58	10.82	82.50	10.10

Of these coals Nos. 1 and 2 are not likely to be of

much value as they are by some the reason as they do not contain a large amount of bitumen. It is typical of most of the coal on the lower Telkwa and should make a most excellent fuel for steaming, and also for domestic use, such as for heating, etc. They are all strong bright coals and should stand transportation well and may some day supply the greater part of the domestic fuel of the Pacific Coast cities.

It is to be regretted that none of these coals make a good coke, No. 2 being the only one that coked well in the laboratory, and it is too high in ash for commercial purposes. In view of the proximity of smelting ores a good coking coal would be of great value, and it is to be hoped that further exploration will bring to light some suitable seams.

It will be seen from the above analyses that the condition of the coal differs widely at points comparatively near together, and it would appear that the proximity of areas of eruptive rocks younger than the coal-measures has been the chief factor in altering it from a lignitic coal to a semi-anthracite.

Among the better known localities the Telkwa River field may be mentioned in more detail. Here the coal-bearing rocks overlie those of the Porphyritic group with probably a slight unconformity, but, as they have subsequently been much folded and disturbed, their relationship to one another is not entirely clear. The coal-measures are the highest horizon represented, being themselves overlain by glacial debris. In a total thickness of not more than 300 ft. of measures, four at least, good, workable seams have been uncovered; the intervening beds consisting of clay shales, often highly nodular with much ironstone, a few beds of soft, crumbly sandstone towards the bottom, and finally a basal bed of coarse, loosely-sorted conglomerate composed chiefly of boulders from the underlying volcanics.

These rocks must have originally covered a much more extensive area than at present, but their soft nature and consequent inability to resist erosion has resulted in detached remnants only remaining in the valleys. As the valleys are wide, and almost invariably heavily drift-covered, the coal is exposed only where the streams have, in a few places, cut through the deep mouths of gorges in the hillsides, elsewhere no natural exposures are to be found and the higher ridges are reached consisting of volcanics, the actual contact being everywhere masked. The result, in addition to this present hard and unamenable to faulting, is that it will be nearly impossible of delineating the coal and prospecting practically is one of extreme difficulty.

The very small thickness of rocks overlying the coal, and the fact that they are folded in a series of short rather sharp curves, and subsequently been subject to denudation, has resulted in time in the formation of a number of small basins where the coals are at times only a few feet thick. It might be possible in some cases to look the coal in a series of open cuts or by stripping the overlying gravel and shales in favourable localities.

Small faults are numerous, and the seams are likewise cut by a number of dykes, usually accompanied by faulting, from the nearby granitic areas.

In regard to the size of the individual seams the following section was measured at the Cassiar Coal Company's property on Goat Creek; this is the most complete section to be found anywhere in the district.

	Feet.
Clay shales.....	
Top seam.....	Coal with a few small clay partings.... 12.0 Clean coal 7.7 Gray sandy shale and covered, about... 2.0 30.00
Middle seam.....	Coal 1.5 Clay shale 2.7 Coal with a few irregular clay partings.. 14.5 Shale with ironstone nodules..... 3.3 Coal 2.0 Gray clay shale, with nodular ironstone bands, about 50.0
Bottom seam.....	Carbonaceous shale and coal..... 2.0 Coal 1.5 Shale 0.5 Coal with small irregular clay partings.. 9.0 Clay shale

Several small seams overlie these. A short distance up the creek beyond these exposures, the two upper large seams have been burned leaving thin beds of slaggy material; the overlying clay shales are burned to a brick red, forming a very noticeable feature in the landscape where exposed in a high cut-bank. The burnt area, however, does not appear to be of any great extent.

In the Transcontinental Syndicate's openings, a few miles higher up Goat Creek, five seams 4 ft., 3 ft. 3 in., 4 ft., 6 ft., and 4 ft., respectively, in thickness were cut in about 130 ft. of measures; while on the property of the Telkwa Mining, Milling and Development Company on the head of the Morice River at least four seams of the following thicknesses—4 ft. 2 in., 4 ft. 6 in., 4 ft. and 7 ft. 3 in.—have been stripped.

Practically all the coal land in this vicinity is controlled by four companies, the three above-mentioned and the Kitamat Development Company.

On the Bulkley River, from a short distance above Moricetown to Sharp Creek (about 12 miles), coal outcrops at intervals, but no workable seams have as yet been uncovered. At Sharp Creek nine small seams were stripped varying from 15 to 40 in. in thickness, but they all proved too high in ash to be of value (an analysis of one of these is given above).

Near the head of the Skeena, about 150 miles north of Hazelton, is situated another important coal field which has been prospected in some detail by the Western Development Company, controlling about 16 sq. miles of coal lands here. In this field the coal-measures occur near the top of a great thickness of sedimentary rocks which probably represent the porphyrites to the south. The rocks here are not so highly disturbed, and there is apparently a greater thickness of overlying strata than at the Telkwa areas. The coal-bearing rocks occupy the trough of

a syncline with gentle dips on either side, the Skeena cutting diagonally across it. At the southern edge of the basin, however, the strata are more disturbed, being often tilted at high angles. At least one seam of good coal, from 5 ft. 6 in. to 6 ft. thick, has been opened up at several places; an analysis of this has already been quoted. Other and smaller seams are known to exist and it is quite possible that the larger one does not represent all the workable coal in this area. The physical qualities of this coal are all that could be desired, it being extremely hard, resists weathering well and is bright and lustrous in appearance. Although no recent volcanic rocks are known of in this neighbourhood, still evidences of volcanic action are not wanting, as the rocks of the coal-measures and the coal itself are found in places to be cut by small quartz veins sometimes more or less mineralized with iron pyrites.

In most of the other coal districts mentioned no workable seams have as yet been found, the coal being either too thin or too highly disturbed to be economically worked. Taking into consideration, however, the difficulties of prospecting already alluded to, there is no reason to suppose that larger and more favourably situated seams do not exist, at least in some of the localities in question.

Although placer miners were the first to prospect the Skeena country, the results so far have not been encouraging, Lorne Creek being today about the only producing locality. This creek has afforded annually a small output of gold since about 1884.

The Omineca country to the east, and reached *via* the Skeena and Hazelton, has long been a producer of placer gold. The old diggings are now nearly all abandoned to Chinamen, but there is said to be a large amount of ground there which can be profitably hydraulicked when transportation facilities shall have been improved and the cost of working lessened correspondingly. The presence of argentiferous galena in that district has also been known for some years as well as that somewhat rare mineral arquerite, a native amalgam of silver, which has been found in the creek gravels.

In the neighbourhood of Kitsilas Canyon, a number of quartz claims holding gold and copper have been located, but the writer is ignorant as to the conditions prevailing there.

In conclusion, it may be said that lack of transportation facilities has prevented the exploitation of a country rich in possibilities, and until the advent of the railway, nothing can be done to open up and develop its latent resources. The present means of communication are highly unsatisfactory, Hazelton, the distributing point, being reached either by pack trail, 400 miles from Quesnel on the Cariboo road, or by river steamer from Port Essington, and as the Skeena is navigable only at certain stages, and then only with difficulty, this route cannot always be depended on. Away from the river, trails are few and bad, and much trail- and bridge-building will have to be done before even the best known camps will be made easily accessible.

ON SURVEYS IN NEW WESTMINSTER DISTRICT AND TEXADA ISLAND.

By O. E. LeRoy.

THE AREA comprised by this season's work extends from the 49th parallel to the mouth of Powell River, a distance of more than 30 miles along the main coast of British Columbia. This includes Burrard Inlet, Howe Sound, Jervis Inlet, the island adjacent to the coast, and Texada Island.

From Burrard Inlet to the International Boundary the country is underlain by conglomerates, sandstones and shales of Miocene age. These rocks

3,000 to 5,000 ft., with individual peaks of 1,000 to 3,000 ft. higher.

A dense forest growth occupies the gentler slopes and the relatively narrow valleys, the principal woods being the Douglas fir, cedar, hemlock and spruce. The steeper slopes are either bare or support a sparse growth of stunted pine.

The streams are nearly all steep grade, and will furnish power as local conditions demand. The stream draining the Clowhom lakes into Salmon Arm and Powell River are of special importance. The former has a fall of more than 60 ft. and the estimated horse power is 12,000. The latter has a total fall of about 120 ft. and it is estimated that 30,000 h. p. could be developed.



Showing Contact of Magnetite with Limestone—Jervis Inlet.

are but slightly disturbed and have low dips to the south. In a few of the sandstone beds small irregular seams of lignite coal are found, but so far no bed of any value has been discovered. The whole area is covered to a considerable depth by glacial and alluvial deposits, and it is only along the south shore of the inlet that the rocks outcrop. In Stanley Park and on Fairview heights, Vancouver City, these sedimentaries are cut by dykes of basic lava, but are of very limited extent.

North of Burrard Inlet lies the Coast Range, and in its northern extension as far as Powell River it is composed of a series of subordinate ranges which run approximately at right angles to the trend of the main coast. The elevation of these ranges is from

The coast range is an enormous batholithic mass of plutonic rocks which vary in composition from the most acid granite to a basic gabbro.

Lying on this batholith and usually occupying depressions are areas of older rocks. These consist of a great variety of massive and schistose rocks of igneous origin, together with limestones, conglomerates, quartzites, and slates representing remnants of the ancient roof of the batholith. These areas are of great economic importance, as nearly all the mineral deposits of low value are either obtained along their contact with the batholith. Both the granite-gabbro batholith and the associated rocks are cut by a large series of dykes which are mainly diabases.

Thormanby, Merry, and Texada Islands are underlain by rocks of the Vancouver series, consisting of

*In "Summary Report of the Geological Survey of Canada for 1906."

two formations. The lower is largely volcanic and is made up of altered ash rocks, chlorite and hornblende schists, porphyrites, and agglomerates. The upper formation is limestone and has a limited distribution along the northeast shore of Texada Island, between Van Anda and Blubber Bay. It has a length of seven and a half and a maximum width of two miles. Both formations are of economic importance, especially the limestone. The Vancouver series is cut by numerous dykes of porphyry, greenstone, feldspar and garnetite, and also by larger bodies of granite, which are extensions from the coast range batholith. Sandstones of Cretaceous age occur along the shore of Gillies Bay on the south side of Texada Island.

of North Vancouver. It has an area of five square miles, and about 35 claims have been staked. The rocks are banded silicious and massive hornblende and epidote schists surrounded by syenites and granites. The ores are zinc blende, pyrite, chalcocopyrite, molybdenite and magnetite. Very little development work has been done beyond the actual assessment work required by the provincial mining regulations.

HOWE SOUND.

The Britannia mineral zone lies on the east side of Howe Sound 23 miles from the entrance. The zone has a width of one and one-half miles along the shore and extends inland about eight miles. The rocks are conglomerates, quartzites, slates and



Open Quarry Face, Texada Iron Mine

Sandstones also occur on the mainland east of Grief Point, between Wolfsohn and Seow Bays. From information received it would seem that the formation has a considerable distribution inland. Small seams of impure lignite coal have been found but no beds of any value have been discovered.

Glacial deposits are of limited extent in the coast range. Boulder clays occur at the head of Howe Sound on the east side, on Anvil Island, where they are used in the manufacture of brick, on Gambier Island, and in the vicinity of Gibson landing.

In the region embraced by this season's work there are, in addition to numerous isolated mineral claims, three areas of special importance. They are the Lynn Creek camp, the Britannia mineral zone and Texada Island.

LYNN CREEK.

The Lynn Creek camp is about eight miles north

sericite schists. The mineralization is confined almost wholly to the silicified sericite schists. The ores are mainly chalcocopyrite and pyrite, the former occurring in lenticular areas and masses while the latter is finely disseminated through the schist and quartz. Both carry appreciable values in gold and silver. On the western half of the zone there are three principal groups, the Goldsmith, Britannia and Empress.

The Britannia Copper Syndicate's mines are 3.5 miles from the beach, and 3,300 ft. above sea level. The company has 8,500 ft. of lode which has a maximum width of 600 ft. The deposit is essentially a low grade proposition, but the enormous amount of ore in sight, and its situation, present most favourable advantages for economic mining and large output. At present the ore is mined only on the Jane claim at the Jane bluff and Mammoth

bluff. The method of mining is by tunnels, crosscuts and slopes, and glory holes. The ore is conveyed to the beach by a Riblet aerial tramway, the shipping ore going directly to the *franchise* and the concentrating ore to the mill. About 350 tons a day are mined at present, but it is the intention of the company to greatly increase the output at an early date. The ore is shipped to the Britannia Smelting Company's smelter at Crofton, Vancouver Island.

The Empress mine lies east of the Britannia, across the divide, in South Valley. Development work, principally by tunnelling, is being carried on with a view of reaching the shipping ore as soon as possible.

The Britannia West Copper Company's property is situated on the west side of the sound and a most

greenstone and chlorite types, and also in some sand zones in the limestone.

At the south end of the limestone band, along its contact with granite, porphyrite and chlorite schist, there are about 20 outcrops of magnetite distributed over half of one square mile. The surface showings indicate extensive ore bodies. A considerable part of these deposits, especially along their borders, is largely impregnated with pyrite and chalcopyrite, and in places the magnetite could be mined for the copper content.

The contact between the magnetite and chlorite schists and the limestone is marked by a series of small but high grade deposits of chalcopyrite and copper carbonates. They are, however, only superficial and have been pretty well worked out.



BRITANNIA WEST COPPER MINE.

due north of Britannia Beach. The ore body is 1,500 ft. square and consists of an impregnated zone in granite porphyry. Small quartz veins are numerous and carry bornite.

At present the company is engaged in building a tram line from the mine to the beach, and in constructing a concentrating mill and other mine buildings, and no ore will be mined until these are completed.

TEXADA ISLAND

On Texada Island the more important ore deposits are either in the limestone formation, or along its contact with eruptives or with the schists of the underlying series.

High grade bornite and chalcopyrite associated with felsitic and garnetite dykes occur in shoots in the limestone. Smaller bodies of these sulphides, together with those of lead and zinc, are found along

In the volcanic series underlying the limestone the ores occur principally in fissure veins in porphyrites and chlorite schists. Galena, chalcopyrite, zinc blende, pyrite and magnetite associated with quartz and calcite gangue are the principal ores. Many of these deposits lack permanence in depth, and their gold and silver values are very much lower than in the similar sulphides in the limestone.

At present the only producing mines on the island are the Marble Bay, owned by the Tacoma Steel Company, and the Cornell, operated under lease by a Seattle syndicate. The Puget Sound Iron Company's magnetite deposits, and the Copper Queen mine, both of considerable promise, have not been worked this (1906) season. The Loyal and Commodore mines are still engaged in development work, and have not yet reached the shipping stage.

The Marble Bay mine is now 760 ft. deep, and the ore shoot at that level is more than 40 ft. long, with a maximum width of 20 ft. The ore is mainly bornite, which is disseminated through green felsite and garnetite. The copper, gold and silver values have steadily increased with depth. About 1,100 tons a month are mined and shipped to the smelter at Tacoma.

In the early part of the summer the Cornell mine was pumped out down to the 260-ft. level. The ore on the 160 and 260-ft. levels is being stoped out and shipped to the smelter at Ladysmith. The present output is between 500 and 600 tons a month. The ore and its mode of occurrence are similar to those of Marble Bay.

STONE QUARRIES.

The limestones of Texada and some of the coast

of the outcrops a little farther inland will permit a more economical development.

At the head of the North Arm, Burrard Inlet, two quarries are being operated by the Vancouver Quarry Company and the Coast Quarries, Ltd., respectively. At present no building stone is quarried, the granite being used solely for concrete work and road metal. On Fairview heights, Vancouver, a basic lava is quarried for road metal.

The Denver, Colorado, *Mining Reporter*, states that the Arizona Territorial Board of Equalization appears to have stirred up called for dissatisfaction among both large and small companies when it recently raised the valuations of patented mining properties. In some instances valuations are said to



Granite Quarry, Granite Island, New Westminster Mining Division.

granites afford good stone for structural and ornamental purposes. Marbleized areas in the limestone have been quarried in the past and some good grade stone produced. The Tacoma Steel Company has quarries and limekilns on Marble and Limekiln Bays. A line of excellent quality is produced which is in much demand both in the home market and at Java. The granite quarries on Granite and Nelson Islands, at the entrance to Jervis Inlet, are both producing excellent building stone. The former is owned by Kelly and Murray, of Vancouver, and the latter by the Ellis Granite Company of Seattle.

Work has recently been resumed at the slate quarry on Deserated Bay, Jervis Inlet. A good grade of slate has been produced in the past, but the amount of waste that had to be handled was one of the serious drawbacks. It is stated, however, that some

have been raised 300 per cent and 400 per cent.

It is estimated that there were produced in the United States in 1906 approximately 335,700,000 tons of bituminous coal and 71,000,000 tons of anthracite. The former showed an increase of about 25,500,000 tons over 1905 and the latter a decrease of 7,700,000 tons.

"The right thing and the courageous thing for legitimate mining papers to do, whenever possible," remarks the Los Angeles *Mining Review*, "is to name companies that are operating dishonestly. This cannot be done often, because evidence must be conclusive. In lieu of this, it is possible to give favourable mention to such companies as are operating legitimately and to ignore those that are not."

SUMMARY OF THE MINERAL PRODUCTION OF CANADA FOR 1906.

Annual Preliminary Statement of Mineral Resources of Geological Survey of Canada.

CANADA'S MINERAL PRODUCTION in 1906 is estimated to have been nearly \$10,500,000 higher in total value than that of the immediately preceding year. With a production of \$69,525,170, 1905 was a record year with a total value \$3,721,000 in excess of the highest previous record. Now 1906 is shown to have made a much larger increase, its production having reached a total value of, approximately, \$80,000,000. The particulars of this comparatively large output of mineral are given in the following "annual preliminary statement of the mineral production of Canada for 1906," prepared by Mr. Elfric Drew Ingall, M. E., mining engineer to the Geological Survey, and his assistant, Mr. J. McLeish, B. A., statistician. In his letter of transmittal Mr. Ingall remarks:

"Although the figures given herewith are subject to revision, they may still be taken as a very close approximation to those which will be given in the final report.

"The completed Annual Report will follow later and, besides containing a revise of the general table of production, will include other details relating to exploration, development, exports, etc.

"Much of this information is not available till several months after the close of the year; the compilation and printing necessarily occupy some time; the Annual Report therefore cannot be completed till well on in the year following the one covered."

SUMMARY OF MINERAL PRODUCTION IN 1906.

(Subject to Revision.)

Product.	Quantity. (a)	Value. (a)
Metallic.		
Copper (b)	57,029,231 lb.	\$10,994,095
Gold, Yukon	\$5,600,000	
" all other	6,423,932	
Iron ore (exports)	74,777 Tons.	149,177
*Pig iron from Canadian ore	104,660	1,724,400
Lead (c)	54,200,000 lb.	3,066,094
Nickel (d)	21,490,955	8,948,834
Silver (e)	8,568,665 Oz.	
Cobalt, zinc and other metallic products		
Total metallic		\$25,738,612
Non-Metallic.		
Asbestos	Short tons.	970,878
Asbestic	"	17,230
Chromite	"	8,750
Coal	"	9,916,177
Peat (f)	"	250
Corundum	"	2,274
Feldspar	"	15,873
Graphite	"	447
Grindstones	"	5,545
Gypsum	"	417,785

Limestone for flux in

Quantity.	Value.
Flux	344
Mica (exports)	113
Mineral acids	
Sulphur	3,000
Ochres	6,337
Mineral water	
Verdigris (g)	100,000
Mercuric (h)	528,898
Pyrites	761,760
Salt	
Talc	76,387
	3,030

\$25,738,612

Structural Materials and Clay Products—

Cement, natural rock	8,610 Bbl.	6,052
" Portland	2,130,164	3,164,897
Sands and gravels (exports) Tons.	256,550	
Slip		446,790
Building material, including bricks, building stone, lime, etc.		7,200,000

Total structural materials and clay products

Total all other non-metallic, as above

Total non-metallic

Total metallic, as above

Estimated value of mineral products not returned

The value of the total yearly production reported for 20 years past has been as follows:

1887	\$2,681,430
1888	3,010,411
1889	14,013,913
1890	16,763,353
1891	18,770,417
1892	16,628,417
1893	20,035,082
1894	20,035,082
1895	20,035,082
1896	20,035,082
1897	20,035,082
1898	20,035,082
1899	20,035,082
1900	20,035,082
1901	66,330,158
1902	66,330,158
1903	63,226,510
1904	63,226,510
1905	63,226,510
1906 (estimated)	80,000,048

REMARKS.

The total value of the mineral production in Canada in 1906, as detailed in the foregoing table, is

*The total production of pig iron in Canada in 1906, from Canadian and imported ores amounted to 598,411 short tons, valued at \$7,823,020, of which it is estimated 4,666 tons, valued at \$1,724,400 should be attributed to Canadian ore, and 493,751 tons, valued at \$6,098,620, to the ore imported.

(a) Quantity or value of product marketed. The ton used is that of 2,000 lb.

(b) Copper contents of ore, matte, etc., at 19.278 cents per lb.

(c) Nickel contents of ore, matte, etc., at 41.64 cents per lb.

(e) Silver contents of ore at 66.701 cents per oz.

(f) Additional returns place the output at 479 tons, valued at \$1,422.

(g) Gross return from sale of gas.

(h) Deducted from the amount paid in bounties and valued at \$1.337 per barrel.

\$80,000,048, as compared with \$69,525,170 in 1905, an increase of \$10,474,878, or over 15 per cent. The statistics show a very healthy condition of growth throughout the mineral industries of Canada. Increases are shown in nearly every item, the only exceptions of importance being gold and petroleum. The decrease in the former is due to the continued falling off in the output of the Yukon placers which reached a maximum production in 1900, while for petroleum the decreased output probably indicates a tendency towards the working out of some of the older fields.

On the other hand specially large increases are shown in the output of silver, nickel, copper and Portland cement, while amongst the other mineral products, both metallic and non-metallic, considerable and general increases in quantities are shown and the total valuations of these are enhanced as well, particularly in the metals, by the higher prices realized in 1906 as compared with 1905.

The following table shows the principal increases and decreases in values:

Product.	Increase.	Decrease.
Copper	\$ 3,496,435	
Gold, Yukon		\$2,727,200
" all other	140,737	
Pig Iron (from Canadian ore)	692,284	
Lead	389,462	
Nickel	1,398,308	
Silver	2,105,422	
Other metallic products..	83,977	
Asbestos	181,819	
Chromite		1,201
Coal	2,424,769	
Corundum	55,820	
Gypsum	5,660	
Natural gas	149,307	
Petroleum		94,268
Natural cement		4,222
Portland cement	1,251,067	
Other net increases	623,672	
	\$13,301,769	\$2,826,891
Total increase	\$10,474,878	

The mineral products which have shown the greatest growth in output in 1906 are as follows in order of their importance: Portland cement, pig iron from Canadian ore, silver, corundum, etc.

The following table shows the percentage of increase or decrease of the more important products constituting over 90 per cent. of the total production:

Product.	Quantity.		Value.	
	Increase.	Decrease.	Increase.	Decrease.
Metallic—	Per cent.	Per cent.	Per cent.	Per cent.
Copper	18.58		46.63	
Gold		17.70		17.70
Pig iron (from Canadian ore only)	53.50		67.07	

Pig iron (from both home and and imported ores)	13.91		20.81	
Lead		4.68		14.54
Nickel	13.85			18.52
Silver	42.95			58.20
Non-metallic—				
Asbestos and asbestic	16.33		32.25	
Coal	14.40		13.83	
Corundum	38.32		37.42	
Feldspar	35.66		65.55	
Gypsum		5.52		.90
Petroleum		10.14		11.01
Portland cement	58.86		65.37	

The study of the figures of the proportional growth or decline of the various leading industries as compared with 1905 will show to what extent the increases or decreases in value exhibited in the previous table were due to the higher prices ruling in many cases. It will be noticed that in nearly every case the effects of increased output were much enhanced by the much higher prices ruling for the product and that in more than one case the effect of an actual decrease in quantity was reversed for this cause.

The following table is intended to convey an idea of the relative importance of the various industries as contributors to the total mineral output of the country. There is but little difference in the relative importance of the various mineral products in 1906 as compared with 1905. It will be seen also that the metallic minerals, together with coal, account for about 80 per cent. of the total output:

1905		1906	
Products.	Per cent.	Products.	Per cent.
1. Coal	25.20	1. Coal	24.93
2. Gold	21.01	2. Gold	15.03
3. Nickel	10.86	3. Copper	13.74
4. Copper	10.78	4. Nickel	11.10
5. Brick, stone, lime	9.37	5. Brick, stone, lime	8.00
6. Silver	5.30	6. Silver	7.15
7. Lead	3.85	7. Cement	3.96
8. Cement	2.75	8. Lead	3.83
9. Asbestos	2.16	9. Asbestos	2.49
10. Iron and iron ore (Canadian)	1.74	10. Pig iron (from Canadian ore)	2.16
11. Petroleum	1.23	11. Petroleum .....	.95
12. Gypsum .....	.84	12. Gypsum .....	.74

Gold.—The total output of gold as estimated shows a falling off of more than \$2,500,000 or nearly 18 per cent. This is due mainly to the continued shrinkage in the shipments from the Yukon, which district fell short of its last year's output by about \$2,750,000. British Columbia showed an increase. For the rest of Canada, which, however, contributed only about 2.5 per cent. to the total, the figures as far as at present available, show practically a stationary condition of affairs.

All the gold production of the Yukon and about 15 per cent. of that from British Columbia is obtained from placer deposits, the whole from this source amounting to 77 per cent. The remaining 23 per cent. represents the gold contents of the sul-

plumet and quartz ores worked in British Columbia and in Eastern Canada. The places are a source of the metal have for some years showed a continuous falling off, which, however, is more than neutralized by expansion in the lake mining branch of the industry. Recent consolidations and the inauguration of extensive enterprises for working the poorer gravels, which exist in large quantities in the Yukon Territory and in British Columbia, are likely in a few years to produce marked results in this line.

Silver.—In 1906, Ontario, British Columbia, Yukon Territory and Quebec contributed to make up the total production of silver which reached 8,568,665 oz., valued at \$5,723,097. This is an increase, in quantity, of 2,574,373 oz., or 42.95 per cent. over the previous year. The average yearly price of the metal on the New York market was 66.791c. per oz. for 1906, as compared with 60.352c. in 1905. This brings up the increase in value of the Canadian production in 1906 over that for 1905, to 58.20 per cent.

Ontario has assumed first place in Canada as a silver producing province, owing to the rapid development of the Cobalt camp, which has attracted the attention of the whole mining world. As is well known, the silver occurs mostly in the metallic condition associated with numerous other minerals; the most prominent of which are cobalt and arsenic. The veins are narrow, but the ore is exceedingly rich. Some shipments are reported to have returned \$100,000 per car load.

The figures of silver in the ores shipped from Cobalt, adopted in this report have received corroboration from data kindly furnished by Mr. T. W. Gibson, deputy minister of the Ontario Department of Mines, who puts the production at 5,500,000 oz. of the metal, when complete returns shall be available. This closely agrees with our own estimate of 5,485,000 oz., which taken at the market price would give a value of \$3,663,486.

British Columbia, on the other hand, shows a slight decrease in 1906 as compared with 1905, owing to the output of the Slocan district having fallen off much below expectations; but this was offset to a great extent by an increased production from the St. Eugene and the Sullivan mine, both in East Kootenay. The falling off of the Slocan, however, is only temporary, and there is every indication of a resumption of activity, more especially if the expected developments take place in the zinc industry. This would permit of mining the large bodies of zinc-lead ores, which are, as a rule appreciably argentiferous.

Copper.—Stimulated by the enhanced price of the metal the production shows a very large increase in quantity, which expansion, together with the higher values obtained is shown in the increase of nearly \$3,500,000, or nearly 47 per cent.

British Columbia and Ontario are as formerly the two main contributors, the former supplying about 79 per cent., the latter about 18.5 per cent.

The average New York prices for the metal for

the years 1905 and 1906 were 15.00c. and 15.15c. per lb. on a basis of 4900 lb. net weight per ton.

In British Columbia the mines of the Boundary district are estimated to have contributed about three-quarters of the output of the province, the Island being the second in importance with the mines operated along the Pacific coast making up the balance. The rest of the Dominion output is represented by the copper contents of the nickel-copper mattes shipped from the Sudbury mines, with a small contribution from Quebec representing the copper contents of the pyrites ores shipped from the mines of the Eastern Townships district. Throughout the whole country the much higher prices ruling for this metal have stimulated the search for new deposits, and the reopening of old mines, some of which can be expected to contribute to next year's production.

Cobalt.—The production of this metal is represented by the amounts contained in the shipments of ore made from the camp of that name in Northern Ontario. It is stated by some operators that in selling the ores value has been received for the cobalt contents; whilst others have claimed to get no return for this metal. As processes of treatment for these complex ores are perfected, however, it is hoped that this unsatisfactory state of affairs will be remedied.

Nickel.—The production of nickel from the ores of the Sudbury district in Ontario has made a very rapid growth during the past two years, the output in 1906 having been more than twice that of 1904. The ore is smelted at Copper Cliff and Victoria Mines to a matte carrying from 78 to 80 per cent. of the combined metals, copper and nickel. The resulting matte is shipped to the United States and Great Britain for refining.

The following were the aggregate results of operations on the nickel-copper deposits of Ontario in 1906:

	Tons of 2,000 lb.
Ore mined	343,814
Ore milled	310,000
Ore produced	98,000
Matte shipped	20,310
Copper contents of matte shipped ..	5,264.6
Nickel contents of matte shipped ..	10,745
Spot value of matte shipped	\$4,629,041

According to customs returns, exports of nickel in matte, etc., were for twelve months ending December 31, as follows:

To Great Britain	2,716.892
To United States	21,252.444

1906 1905

The price of refined nickel, according to the London Metal Exchange and New York market, remained fairly steady from January 1 to September 8, quotations for large lots, New York delivery, being from 40 to 45 cents per lb. From September 8 to the end of the year quotations were from 45 to 50 cents per lb. according to time and condition of

order, while for small quantities prices were from 50 to 65 cents per lb.

Although nickel is one of the minor constituents of the rich silver ores of the Cobalt district, the buyers of these ores have made no allowance for the nickel contents, and statistics of its output have not been obtained.

Lead.—The figures of production of lead show a slight decrease in tonnage this year as compared with 1905; but owing to an increase of 20 per cent. in the average yearly price of this metal on the New York market the value is very sensibly greater. The total quantity produced in 1906 was 54,200,000 lb., valued at \$3,066,094, whereas in 1905 a quantity of 56,580,703 lb. was recorded, valued at \$2,676,632.

The average yearly price of lead in the New York market for 1906 was 5.657 cents per lb., as compared with 4.309 cents for the previous year.

About 95 per cent. of the above figure of production is to be credited to British Columbia, the great bulk being derived from East Kootenay district. However, when arrangements shall be completed which will permit of mining the bodies of zinc-lead ores of the Slooan district there is no doubt that a much larger production will be recorded.

Zinc.—Throughout the year great hopes were entertained that the problem of utilization of the zinc ores of British Columbia was drawing very near to a solution. The Federal Government had appointed a commission to study the question of the sources and of the market for these ores, and a large zinc smelter was being erected at Frank, Alberta, through the enterprise of a group of French capitalists. The conclusion of the commission was that a satisfactory supply of zinc ores could probably be obtained in the Kootenays. The Frank smelter was put in operation and several tons of spelter were turned out from ores derived mainly from the Slooan district, but owing to defective apparatus the plant will require extensive and costly alterations before it can be run on a remunerative basis.

Iron.—The total production of pig iron in Canada in 1906 from both Canadian and imported ore amounted to 598,411 short tons, as compared with 525,306 tons in 1905, or an increase of over 13 per cent. in quantity. This production represents the output of nine companies operating 15 blast furnaces. Of these furnaces, three use charcoal as fuel, and 12 are run on coke.

The ore charged into the blast furnaces totalled 1,204,473 short tons, of which 221,733 tons were Canadian ore, and the balance, or 982,740 tons, was imported. The production of pig iron attributable to Canadian ore amounted to 104,660 tons, which is a marked increase over the previous year, when the production amounted to only 68,170 tons.

Beside the above quantity of Canadian iron ore charged into the furnaces, 74,778 tons were exported, which brings the total of iron ore produced in Canada in 1906 to 296,511 tons. This is only a slight increase over 1905, but the interest which seemingly was taken in Canadian iron ore deposits in 1906,

presages a great improvement, in a near future, in this industry. There is apparently no reason why the mining of iron ore in Canada should not take a much greater development than it has in the past.

Asbestos.—The production of asbestos from the Eastern Townships of the Province of Quebec, divided into crude and mill stock, was as follows:

	Tons.	Value.
Crude	3,793	\$ 626,895
Mill stock	55,490	1,343,983
Total asbestos	59,283	1,970,878
Asbestic	20,127	17,230
Total products	79,410	\$1,988,108

Exports of asbetus, according to customs returns were 59,864 tons valued at \$1,689,257.

The special features of interest regarding the asbestos mining industry during the year have been a general increase in output, a marked improvement in plant and machinery in some of the older mines, the opening up of new and promising properties, and a tendency toward the consolidation of a number of mines formerly separately owned, under one management and ownership.

Coal and Coke.—The provinces of Nova Scotia, British Columbia, Alberta, Saskatchewan, New Brunswick and the Yukon Territory contributed to the total coal production, their relative outputs being in the order named. Nova Scotia figures in the coal returns for more than 60 per cent. of the whole Canadian production, and British Columbia for slightly over 20 per cent. As far as the figures now available will permit us to compare, the output for 1906 shows an increase of 1,248,229 tons over 1905.

The coal output is growing steadily and for the past 12 years each year has shown an increase over the preceding one. The salient feature of the Canadian coal industry in 1906 is the great development which coal mining has assumed in the western provinces, more particularly in Alberta. In this last province there were in 1901 only two mines which produced over 100,000 tons each per year. In 1906 not less than six collieries had an actual production greater than this figure; and several others, whose output did not quite reach the 100,000 tons mark are equipped to easily handle this quantity.

In Nova Scotia and in British Columbia the increases of the past few years have been due mainly to the development of comparatively old established collieries.

An appreciable proportion of the coal of both eastern and western provinces was converted into coke for metallurgical purposes. At the end of the year there were about 800 coke ovens in operation in Nova Scotia, and somewhat over 1,000 in Alberta and British Columbia.

The main features of the coal industry in 1906, as well as special notes on new discoveries both in the east and in the west, have been published in the "Summary Report of the Geological Survey of Ca-

made for 1906." (See "Summary Report," page 192).

Petroleum and Natural Gas.—The production of petroleum is practically all derived from the Ontario peninsula, the only exception being a very small quantity obtained in New Brunswick in the Miramiscouk field. Beside the old established fields of Lambton and Kent counties, some new oil-pools were brought in in 1906, mainly those of Merlin in Tilbury township and of Moore township.

In the western provinces there has been great activity displayed in search for petroleum and natural gas; large sums have been spent in boring operations both in Alberta and Saskatchewan, but so far we have no production to record from these.

The figures of production of natural gas show a substantial increase over those of 1905, resulting mainly from the development of new gas-pools by the Dominion Natural Gas Company, in Brant, Haldimand and Norfolk counties. This company and the Provincial Natural Gas and Fuel Company are now the largest Canadian producers. The Medicine Hat field, in Alberta, has also produced very satisfactorily, and shows no perceptible sign of diminution.

Cement.—The total quantity of portland cement made in Canada in 1906 was 2,152,562 bbl., as compared with 1,541,568 in 1905, an increase of 610,994 bbl., or 39.6 per cent. The total sales of portland cement were 2,119,764 bbl., as compared with 1,346,548 bbl. in 1905, an increase of 773,216 bbl. or 57.4 per cent. Additional details will be found tabulated below.

Fifteen companies were operating plants during 1906, with a total daily capacity of about 10,500, viz.: one in Nova Scotia, two in Quebec, eleven in Ontario, and one in British Columbia. At least four plants were under construction during the year of which the total initial daily capacity will be about 4,700 bbl.

Detailed statistics of production in 1905 and 1906 are as follows:

	1905	1906
	Bbl.	Bbl.
Portland cement sold.....	1,346,548	2,119,764
Portland cement manufactured	1,541,568	2,152,562
Stock on hand 1st January.	111,446	269,558*
Stock on hand 31st December.	306,466*	302,356
Value of cement sold.....	\$1,913,740	\$3,164,807

The imports of portland cement into Canada in 1906 were:

	Quantity.	Value.
Six months ending June..Cwt.	945,187	\$319,021
Six months ending December.....Cwt.	1,480,573	\$507,885
The year 1906.....Cwt.	2,430,760	\$778,706

*Note.—Some companies do not take stock at the end of the calendar year, consequently their estimates of stock on hand do not always agree from year to year.

Total, equivalent to 664,000 bbl. at an average price per bbl. of \$1.12. The duty is 1 1/2 cents per 100 lb.

For comparison in 1905 were equivalent to 611,000 bbl., valued at \$1,138,548, or an average price per bbl. of \$1.24.

There is very little cement exported from Canada. The consumption is therefore practically represented by the Canadian sales, together with the imports.

Following is an estimate of the consumption of portland cement in Canada for the past six years:

Year.	Canadian. Bbl.	Imported. Bbl.	Total. Bbl.
1901	347,000	500,000	847,000
1902	594,594	544,954	1,139,548
1903	627,741	773,678	1,401,419
1904	910,318	781,059	1,691,377
1905	1,346,548	977,778	2,324,326
1906	2,119,764	694,503	2,814,267

ENLARGEMENT OF B. C. COPPER CO.'S SMELTER AT GREENWOOD.

Particulars of Progress of This Important Work.

BOUNDARY COPPER SMELTERS have attracted the particular attention of metallurgists by reason of the low cost of smelting at these works. In calculating the profit-earning capacity of these important industrial establishments it is now customary to assume that with their modern equipment and large treatment capacity the copper they produce should cost as low as between 8 and 9 cents per pound. With copper at the average market price of recent months this, of course, leaves a large margin of profit.

Recognizing the advantage of being in a position to produce much more largely than under the then existing conditions of having a comparatively small plant the directors of the British Columbia Copper Company adopted the recommendations of their manager, J. E. McAllister, and authorized him to design a modern smelting plant to have a treatment capacity of about 2,000 tons *per diem*. In due course the plans were completed and approved, and about a year ago the requisite work preliminary to installation was commenced at the site of the old plant, situated at Greenwood, Boundary district.

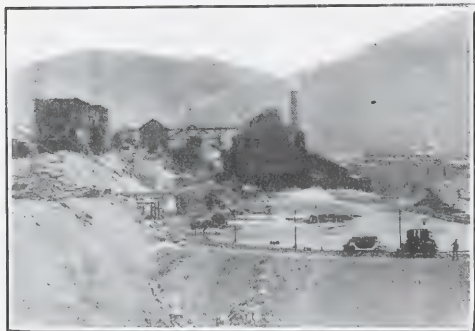
Recently the *Anacoda News*, the youthful editor of which has from the time of the installation of the company's first plant taken a deep interest in the construction and later operation of the works, published an illustrated account of the work of enlargement and re-equipment. This narrative (with trifling alteration) and several of the accompanying illustrations are reproduced, as follows:

During the greater part of the past year the work on the enlargement of the B. C. Copper Company's smelting works has been steadily prosecuted and now the finishing touches are being put on the new plant.

A start was made on the extensive excavations for the foundations of the buildings and machinery on

February 27. The first work was done on the site for the new power house, and grading for the machine shop and converter building extension was commenced shortly afterwards. The force employed on construction was increased until, by the end of March, a large number of men, teams and dump carts were engaged.

Work on the stone foundations and on the rebuilding of the ore bins was begun about March 15. Toward the end of March a gang of men began taking



B. C. Copper Co.'s Smelter

Showing Furnace Floor Level before erection of New Furnace House, etc.

down the old ore bins, beginning with the extreme western section. Work was also started on the overhead traveller, for carrying heavy timbers to different parts of the ore bin floor. This device, which has only recently been removed, after having been in use more than seven months, consisted of two very heavy timber towers supporting a 1-in. wire rope, secured at the ends much after the manner of a suspension bridge cable. The cable was provided with a "traveller," operated by a hoist at one end, and was capable of handling singly the heaviest timbers used in the new bins, and lighter timbers several at a time.

Two cars of timber having arrived, work was commenced on the new water tank. This is located end to end with the old tank, and both are of the same capacity (about 90,000 gal. each). After the furnaces were blown out, in June, the old tank was emptied and raised some 8 or 10 ft. to the same level as the new; thus affording two separate water units, and making it possible to clean or repair either tank without stopping the furnaces; also providing a larger water reserve.

In April a number of carpenters began framing timbers for the new ore bins; however, this work was much delayed throughout by the slow arrival of material. More than 1,330,000 ft. of lumber were used in the construction of these bins. Work at excavations on the converter and ore bin floors was rushed during this month, and, as well, on numerous stone foundations.

Shipments of machinery for the new smelter began to arrive about May 1, the first earload to be received

having been a drive wheel for one of the new blowers. This wheel was cast in two sections, and alone occupied an entire flat car. A week later another blower wheel arrived, and about the middle of the month, the power tools for the new machine shop.

During May construction was steadily carried forward, with the greatest activity on the furnace floor, where excavations for the building containing the machine shop, blacksmith shop, store room and carpenter shop were completed and the erection of the building started. Toward the end of the month a considerable force was put to work on the stone retaining walls on this floor, and also on the foundations for the new furnaces. Up to May 15 both the old furnaces were kept running full blast. The last furnace was not blown out until June 4, by which time the greater portion of the old bins had been torn down, and a large part of the foundations for the new ones erected.

As soon as the last furnace was shut down, work was started on the dust flue, the lower section of which was deepened over 12 ft. At a point opposite the blower room the flue was doubled in width, thus forming a large dust chamber. Between the flue and the furnace foundations an excavation about 12 ft. in depth and 15 ft. in breadth was dug for the new slag railway, and a retaining wall built on each side of it; the wall on one side forming the outer wall of the flue.

Toward the end of June large quantities of machinery and material began to arrive, including the structural steel for the addition to the converter building and the new furnace building; the blower plant; several cars of furnace material; electric motors, etc. With the first shipments of machinery was a 10-ton travelling crane, which was set up so as to run directly over the lower (converter) spur of



B. C. Copper Co.'s Smelter.

Showing Retaining Walls, Furnace House (incomplete), and Downtake from one Blast Furnace.

the Canadian Pacific railway, and is used in unloading cars.

During July the framework for an extension of the south end of the converter building was erected, and

a start made on the steel furnace building, also on setting up the first of the new furnaces. In the power house an electric compressor was installed about this time; this is being used to supply air for the operation of a tamping machine used in lining the converter shells.

The only change in the sample mill has been the installation of a belt conveyor, which carries the ore from the mill bin to the nearest spur and dumps it into railway cars, which are afterward unloaded into the main bins. This arrangement obviates hand tramming in this part of the works.

By September 1 the first furnace had been set up, and much work done on the second. The foundations for the ore bins were finished, and the greater part of the framework raised into place; however, work on the bins was almost at a standstill during a portion of the month, owing to shortage of lumber. The first of the 25-ton slag cars arrived at the smelter September 1, after having made the journey from the factory in Pennsylvania, where it was built, to Green-

trains are drawn by electric locomotives, of which there are five. The cars are run directly under the chutes from the bins to receive their loads, and are weighed on scales beneath the bins, of which there are 18. The furnaces and converters are all down operated by air hoists, which, being lowered after each charge, keep the feed floor unusually free from fumes.

From the furnaces the slag runs into settlers, the slag being run from the main bin, tapped directly into a trough leading to ladles, which are then conveyed by the 40-ton crane to the converter. From the settler the slag runs into the 25-ton cars, which are handled by electric motors, and dumped by electrically-operated worm gears. An ingenious device is employed to prevent slag from spilling on the floor while the filled pot is being exchanged for an empty one. A "spoon" of large capacity is swung under the slag spout before moving the full pot; this receives the flow of slag until the empty car is in place.

The plant, taken as a whole, is the most complete



B. C. Copper Co.'s Smelter.
General view of Works after enlargement.

wood, a distance of 3,000 miles, on its own wheels.

The first of the new furnaces was blown in on October 2 and the second on October 31. However, it was soon found impracticable to run two furnaces until the trestle carrying the tracks for the mechanical feed trains, which are to run in a complete loop under the bins and past all three furnaces, was completed. This work is now finished, and the lining of the remaining bins nearing completion. A roof of corrugated iron is also being built over the entire new section of the bins.

A brief description of the working of the new portions of the plant follows, in conclusion:

The new bins are so built as to be parallel to the railway tracks above, of which there are four, thus allowing every bin to be filled directly from railway dump cars. The bins are raised some 6 ft. from the ground, furnishing room for the tracks of the mechanical feed trains, which run beneath. The feed trains are made up of from three to six side-dumping steel cars holding about three tons of ore each. These

and at the same time the most economical to operate of any yet built in the Dominion. Inasmuch as the construction of the new plant was controlled somewhat by the permanent features of the old, some portions of the former are not altogether as efficient as they might have been had it been possible to build everything new. Still, the work as a whole reflects the greatest credit upon Mr. J. E. McAllister and his able assistant, Mr. George Williams, and is a plant of which the residents in the Boundary district may well be proud.

"Arrangements are being made for shipping a car-load of ore from the Aberdeen group of mineral claims on Ten-Mile Creek," says the *Nicola Herald*. "According to reports received by the Boundary district, the property in question, reports very good showings. If the results are satisfactory a further shipment will probably be made, and thus furnish a reliable index of the value of the ore taken from this property."

OCURRENCE OF COPPER ORE ON THE NORTH PACIFIC COAST.*

By Wm. M. Brewer, M. E., Victoria, B. C.

COPPER ORE DEPOSITS on the North Pacific Coast have for years had the attention of Mr.

Brewer who in the course of his long-continued observations and enquiries has obtained much information concerning them. In the August, 1906, number of the *MINING RECORD* (pp. 308-312) there was reprinted a paper entitled "Some Observations Relative to the Occurrence of Deposits of Copper Ore on Vancouver Island and Other Portions of the Pacific Coast," written by Mr. Brewer for the annual meeting of the Canadian Mining Institute held in the City of Quebec. This year, additional information having been meanwhile acquired, the subject is further dealt with by Mr. Brewer, as follows:

Since submitting the paper read at the Quebec meeting of the Canadian Mining Institute in March, 1906, I have had further opportunities of investigating this subject. The result of these observations has confirmed more fully the view that the classifications of the various deposits of copper ore as noted in the previous paper, are substantially correct. They are as follows:

1. Bornite ore accompanied by some carbonates, chalcocite, and, at the deeper levels, chalcopyrite, which occurs in contact deposits between crystalline limestone and igneous rocks, usually felsite associated with which is garnetite.

2. Chalcopyrite ore which occurs sometimes with magnetite but often in a quartz matrix in deposits of lenticular structure in fissures in the basic igneous rocks.

3. Chalcopyrite ore usually in a magnetite matrix which occurs as contact deposits between crystalline limestone, slate or schist, and igneous rocks.

4. Chalcopyrite ore occurring in association with iron pyrites, barite or heavy spar, and a small percentage of lime which up to date has only been found in a schist country rock.

5. Pyrrhotite ore carrying low copper values sometimes in a gangue composed of a high percentage of epidote, garnet, amphibolite and some calcspar, which occurs either in fissures in basic igneous rocks, or else at the contact of crystalline limestone and the igneous rocks.

As I stated last year the examples of the first of this series were confined (so far as known at the time) to a portion of Texada Island, a few locations on Sidney Inlet on the west side of Vancouver Island, Gribbell Island, all in British Columbia, and the vicinity of Whitehorse in the Yukon, as well as a few points on Gardner Canal in the neighbourhood of

Gribbell Island. To these localities should now be added, it is believed, the Rainy Hollow camp about 40 miles northerly from Haines' Mission on Lynn Canal. These last deposits I have not personally examined, but from descriptions afforded by men familiar therewith, they should clearly be classed under the first of the series referred to. Moreover, on the evidence of recent information, it seems that the copper deposits in the vicinity of Copper River and the headwaters of the White River should also be so classified.

In respect to the last-mentioned copper belts, a reference to a map of that district will show that a line drawn in a northwesterly direction from the Whitehorse copper belt would pass through the head of the White River and thence into the heart of what is known as the Copper River copper belt. In fact, it would pass only a comparatively short distance north of the Rainy Hollow copper deposits; consequently, without any great stretch of imagination, it may be concluded that there is some relationship between the Whitehorse, Rainy Hollow, head of White River, and Copper River copper deposits; but whether it will be discovered eventually that there is any actual connection between these various belts of copper-bearing formations, or each one is distinctly isolated, is a question that can be settled only by further exploitation.

During the past summer serious effort was made in the development of copper-bearing deposits on Hetta Inlet, on the west side of Prince of Wales Island, which undoubtedly belong to this first class; but like the examples of this class on Sidney Inlet, Vancouver Island, the occurrences are confined to a comparatively limited area, the formation covering possibly two miles square. The geology is practically identical with that on Texada Island, the only noticeable difference being that the granite is more closely associated with the ore bodies than is usually the case either on Texada Island or in the Whitehorse copper belt; but the structure of the ore bodies and the character of the ore, as well as the gangue material, are almost identical with the other examples belonging to this class.

The occurrences on Texada Island are more extensively developed than any of the other deposits of the same class. During the past year development work and shipment of ore has been carried on continuously, especially at the Marble Bay mine, where the lowest depth reached is, today, about 900 ft., and the lowest level where stoping is done, 760 ft. From reliable information I am of the opinion that further prospecting along the contact of the limestone and felsite on these deeper levels will demonstrate the occurrence of other ore bodies. In fact, on the 680-ft. level of the Copper Queen mine, on Texada Island, such has been the case, while at the Marble Bay the ore body shows every indication of trending more directly toward the ore body on the adjoining claim, the Copper Queen, than it did when an examination of both properties was made by me some four years ago.

In the Whitehorse copper belt, there has been con-

*"Further Observations Relative to the Occurrence of Deposits of Copper Ore on the North Pacific Coast and Adjacent Islands, from the Southern Boundary of British Columbia to the Alaskan Peninsula"; being a reprint of a paper prepared for submission to the Ninth Annual Meeting of the Canadian Mining Institute.

considerable development work done during the past year, and some ore shipped from the Copper King claim and the Carlisle adjoining it to the east. The most extensive development work has been done, however, on the Pueblo mineral claim situated about a mile and one-half south-westerly from the Copper King, and on the opposite side of an enormous mass of granite. This was one of the concessions located in 1899, and bonded, at that time to the British-America Corporation, one of the Whittaker Wright creations, which also purchased the Le Roi mine in southern British Columbia.

Under that bond an incline shaft was sunk about 85 ft., and a drift driven from the bottom for something like 100 ft.; but the showing from this work was poor; the material extracted from both the shaft and the drift having been principally red hematite iron ore, which carried an average of possibly about 2 per cent. copper, although the material taken from the surface was of higher grade. Notwithstanding that the outcroppings covered an area of about 200 ft. square, no other attempt was made to even prospect, and the property reverted to the original owners in the fall of 1900. From that time until last summer nothing was done on the property, although some shallow prospecting was done on an adjoining claim. However, in the spring of 1906 Byron N. White, who had been a successful operator in the Slocan silver-lead district of British Columbia, purchased this concession together with the Carlisle and Tamarack, which, alone of the 20 concessions originally located and bonded to the British America Corporation, remained in good standing. Mr. White proceeded at once to thoroughly prospect the surface of these extensive outcroppings, and, within a short time, had demonstrated that the work done by the British America Corporation had been on the leanest portion of the entire outcrop; for from other portions he mined, by surface work, ore which yielded from sorted samples as high as 12 to 14 per cent. copper, and in September last, he had mined about 1,000 tons, which would yield an average, without sorting, of about 5 per cent. copper.

It is worthy of note that this capital, together with that furnished by the British America Corporation in 1900, are the only instances on record where any outside investment has been made in the Whitehorse copper belt; but as a result of Mr. White's work on the Pueblo and Carlisle, considerable activity was shown during the late fall, by the representatives of capital sent in to examine the belt. In short, until recently so little was known of the district abroad, that not long since reports were published in the eastern papers of interviews with Mr. Chiffoley, of the Dominion Geological Survey, in which appeared the statement that the Whitehorse copper belt had been discovered in the fall of 1906, notwithstanding that as early as the fall of 1904 I had in an article contributed to the *Engineering and Mining Journal*, fully described the camp, together with the principal mining claims—notably the Copper King, Carlisle, Pueblo, Arctic Chief, Grafton, and Rabbit's Foot.

The view expressed in the article was based on observations made previously on Texada Island, the Whitehorse deposits at that time being merely undeveloped prospects; but the general correctness of the opinions then expressed has since been demonstrated.

The present high price of copper, in connection with the good showings exposed by development, is stimulating capitalists to carry on heavy operations in the districts where this class of copper ore deposits occurs. I do not anticipate, though, that any very big mines will be opened in such camps, but when the grade of the ore is considered, together with its persistency in depth and continuity as well as regularity of structure, although lenticular, I am of the opinion, and the past records support that opinion, that such properties can be made commercial successes provided the operations are carried on with proper conservatism by experienced engineers who are not prejudiced or biased before commencing operations.

This last remark is particularly pertinent to this class of ore deposits, because, about five years ago, no less than four prominent mining engineers advised the then owner of the Marble Bay mine, on Texada Island, to stop the ore from above the 140-ft. level, which at that time was the deepest attained, and abandon the property. He subsequently sold the mine for \$150,000, and the present owners realized this sum from the net returns on ore mined, and made their full payments 12 months before they were due; in addition to purchasing and installing an entirely new machinery equipment capable of carrying the work to 2,000 ft. or deeper, and the mine is now paying regular dividends.

Referring to the second class of ore deposit, that in which the chalcopyrite ore occurs sometimes with magnetite but often in a quartz matrix in deposits of lenticular structure in fissures in the basic igneous rocks, there is little to add to the remarks contained in the paper submitted a year ago, for no development work of consequence has been performed on any of these occurrences.

However, in addition to the districts already mentioned, namely, those of Vancouver and Prince of Wales Islands, this class of ore deposits is found in southwestern Alaska, in the Prince William Sound district—especially in the mountains surrounding Landlocked Bay and on Knight Island. In the first-mentioned camp several veins filling fissures in basic igneous rocks, generally called pegmatites, may be noted. The ore in these veins occurs in lenses sometimes having quite considerable lengths and at other times of inconsiderable lengths, with the lenses separated by several and irregular joints, which, being a little more, may be termed "lenticular," but which, rarely, if ever, carries commercial value, although usually showing low copper values.

The development of these veins has not yet begun; the only work done last summer was confined to open-cut work and shallow prospect holes, to represent "assessment" work. In some instances, how-

ever, notably on a property known as the Putz, Steinmetz & Egan, where the ore in the fissure apparently maintained continuity for a distance of 400 ft. along the line of strike, which fact had been partially proven by open cuts and surface stripping made at irregular intervals for that distance; and on another property—the Montezuma, owned by Dickey and associates—as well as on an adjoining group of claims owned by Hemple and associates, indication was found that the ore-bearing fissure maintained continuity for a considerable distance along the line of strike.

The factor, though, referred to in my former paper, as being doubtful in this class of ore bodies, *i. e.*, the maintenance of continuity with depth, is equally doubtful in respect to Landlocked Bay and Knight Island occurrences of copper bearing ore, as, also, in reference to the same class of ore deposits along the coast to the south, and until more development work shall have been done, an opinion, in either direction, is not justifiable. Nevertheless during the present year this question of maintenance with depth on this class of ore bodies will be to some extent solved in the Prince William Sound district, where active operations will doubtless be carried on at properties recently acquired under bond. Meanwhile prospects on Knight Island have, during the winter of 1906-07, been bonded by Seattle, Pittsburg, and New York speculators, but it will not be possible for an examination of these claims to be made until next summer.

During the past season my attention has been called to some occurrences of highly silicious copper ore in the mountains bordering Portland Canal, on the British side. These occurrences, although no magnetite is found as the matrix of the ore, should be classed with the second of the series. The ore is a combination of iron and chalcopyrite in a quartz gangue occurring as filling well-defined veins in the greenstone country rock. These veins are very persistent and can be easily traced for several hundred feet. The grade of the ore is so comparatively low that it is doubtful if previous to the advance in the price of copper, successful operations could have been carried on, except by using the ore as a flux for the treatment of heavy iron ores, such as are found on Prince of Wales Island.

The width of these ore bodies is a variable quantity; it ranges from 2 to 17 ft. of quartz ledge-matter with grains and kidneys of pyrite scattered through the quartz, but only forming a small proportion of the entire vein filling.

Of the third class of ore bodies, that in which chalcopyrite ore occurs usually in a magnetite matrix as contact deposits between crystalline limestone, slate or schist, and igneous rocks, there is much more known today than a year ago, as a result of development work; and the largest tonnage of ore shipped during the past year has been from this class of mines.

In British Columbia, along the coast and adjacent islands, little has been done to properly develop this

class of occurrence, but on Prince of Wales Island in Alaska, also in Prince William Sound district, the efforts made to develop such properties have been earnest and attended with gratifying results in some instances, especially so on La Touche Island, where the ore occurs at the contact between a graphitic slate and an igneous rock resembling an andesite, but which has never been microscopically examined, and consequently is known locally by several different designations, often even being called quartzite, due to the fact that the rock is extremely quartzose in character and the crystals of hornblende so minute, to be recognized only with difficulty by the aid of an ordinary lens.

The main cross-cut on this ore body has proved it to be 205 ft. in width, averaging about 5 per cent. copper, of which 55 ft. will produce ore carrying an average of 10 per cent. copper. Drifting on the same level has opened up the body along the strike for a length of about 240 ft., with high-grade ore in the face of the drift towards the north, and with a fault in the formation shown in the face of the drift towards the south. This ore body has not yet been developed to any great depth for the reason that the outcroppings form a high bluff, from which ore has been quarried to a depth of 85 ft. below grass roots, and shipments are confined to the product from this bluff, while the main cross-cut is on a level about 40 ft. below the floor of the quarry. Another cross-cut adit is being driven 100 ft. lower, and recent reports were that the ore body was met with at a point about 40 ft. further westward than in the upper adit. It was expected that by the action of erosion, which had caused a considerable portion of the face of the bluff to be carried off, the adit on the lower level, which is below the zone to which erosion has acted, would demonstrate that the ore body was of considerably greater width than was shown in the upper adit.

La Touche Island, although only about 15 miles in length, and an average of about six miles in width, promises to be one of the greatest producers of copper ore on the Pacific Coast. There is here a zone carrying mineral and showing contact between the graphitic slate and igneous rock almost the entire length of the island. Apparently this mineralized zone has attained its maximum extent on the Robertson-Beatson property, which is described above. It is doubtful whether any such extensive body of copper ore of good average grade will be found elsewhere along the Pacific Coast. Another property which belongs to this same class is the Ellamar on the coast of Prince William Sound, where the country rock formation is very similar to that on La Touche Island, but the ore body itself occurs between slate walls, and the outcrop shows below the high-tide mark on the beach. This fact would prevent an examination to determine whether or not the same contact exists as on La Touche Island.

In developing this property a depth of 600 ft. has been attained, but the length of the ore body is comparatively short and until last year no serious efforts

to prospect along the line of strike of the copper-bearing formation has been made. This mine has been a producer of high-grade copper ore since 1902, as also has been the Robertson Easton mine, but on the former stoping has been carried out to some level, while on the latter shipments have been made from the surface (open-pit) only.

More extensive exploration than has been done so far in the Prince William Sound district is necessary before a comprehensive description of the occurrences of copper-bearing ore, and the relationship, if any, that they bear to each other can be made.

The ore bodies of this class on Prince of Wales Island,—and these have been thoroughly exploited during the past season,—are the Stevenstown, Mamie, and Mt. Andrew, on Kasaan Peninsula, from each of which a considerable tonnage of ore has been shipped. The deepest work done has been on the Mamie, where a depth of some 300 ft. has been attained, and this work has demonstrated that the lenticular structure so general along the line of strike of this class of ore bodies is also apparently the rule when they are considered perpendicularly.

The theory, sometimes advanced, that there is a relationship between the length and depth of ore bodies of lenticular structure does not hold good, so far as my observations go, in the occurrences of copper-bearing ore on this coast. Hence, although as in the case of the Mamie mine, a deeper development has shown that the lenses of ore, which outcropped on the surface, may be, and in many cases will be, repeated at variable depth below, even though the surface lens should be apparently cut off entirely at the bottom,—no theory can be advanced regarding the bearing of ore contained in them, unless the two sides are exposed.

The presence of garnetite having a dyke structure is especially noticeable on the Mamie property, and regarding this there is a very interesting problem not yet solved. This is in respect to the origin of the garnetite, usually associated with a rock locally designated as felsite, and classified by some petrographists as augite-porphyrity. Another opinion has been advanced with regard to this rock, that it is not igneous, but only a formation evolved from the contact of limestone and granite. Doubtless the members of the United States Geological Survey, who have taken specimens of the various classes of the country rocks, will have these properly classified within a short time, and if that classification corresponds with the classification of similar rocks made by the geologists of the Geological Survey of Canada, then a scientific question will have been settled definitely.

There is one feature connected with all the contact occurrences of copper ore, where limestone is one of the contact rocks. No ore occurs except associated with more or less garnetiferous felsite (the local designation) and, so far as observed, there is apparently no association between the granite and the deposition of the ore.

At the Mamie mine it has been demonstrated to

one extent that, among the occurrences of this class of property is at depth; for the reason, that little if any ore has been discovered below the different lenses of ore; also it is noticeable that the lines of contact are so irregular that it is difficult to trace them to any considerable depth. The method of development is followed.

The future of this class of ore occurrences depends almost entirely on the extent and grade of the lens that outcrops at the surface; because in a case where this is of sufficient importance from a commercial standpoint for ore to be mined and treated at such cost as will leave a substantial margin to pay the expense of prosecuting further exploitation, then a systematic and thorough method of prospecting at deeper levels can be carried out. On the other hand, if the surface lens is limited in tonnage, and the ore comparatively low-grade in value, there would be little encouragement for an operator to attempt such thorough exploitation at deeper levels.

The other properties belonging to this same class (the third in the series) situated on Prince of Wales Island, on which development has proceeded during the past year are the Rush & Brown on the coast of Karta Bay; the Mammoth, near the head of Kasaan Bay; the Cymru on the shore of the north arm of Moira Sound, and some prospects near the south end of Prince of Wales Island; but on none of these properties has development been carried to so great a depth as on the Mamie.

So far as the fourth class of ore bodies is concerned, that in which chalcopyrite ore occurs in association with iron pyrite, barite or heavy spar, and a small percentage of lime, it is noticeable that this class of ore has not yet been discovered anywhere on the Coast except on Mt. Sicker, where mining operations on several claims have been conducted since 1899. The principal mines opened are the Tyee, from which about 200,000 tons of ore have been mined and treated; the Lenora, which has produced some 50,000 or 60,000 tons of ore; and the Richard III, now being actively operated after having remained idle for about two years. Of these mines the Tyee has been the most important. It has been in continuous operation since 1900, and the development has been carried on to a depth of 1,250 ft.

The occurrences of ore on Mt. Sicker in the schist country rock afford an interesting study to the geologist, as well as to the metallurgist; to the former, because notwithstanding the large extent of the ore bodies, especially in the Tyee mine above the 300-ft. level, no other ore was discovered until the 1,000-ft. level was reached so far as exploitation has shown, and this has been carried on very thoroughly between that level and the 1,250-ft. level; to metallurgists, because of the high percentage of barium sulphate

Below the 1,000-ft. level in the Tyee mine, ore of a much higher grade than in the upper levels was exposed down to the 1,250-ft. level. At present development work is being carried on at these levels, while the main shaft

is being sunk to the 1,400-ft. level and ore mined from above the 300-ft.

The development of the Richard III mine is being prosecuted vigorously, work on the Tye having shown that the ore body maintained continuity along the line of strike into the Richard III ground.

One noticeable feature of the Mt. Sicker ore bodies is that the outcroppings are of comparatively limited extent; in fact the major portion of the ore bodies do not outcrop at all along the line of strike. The country rock, in which the ore bodies occur, is a schist; but whether of aqueous or igneous origin has never been definitely settled. Owing to the presence of graphite and from the general appearance, I have always been of the opinion that this schist is sedimentary, having become more or less metamorphosed by reason of the intrusion of masses and dykes of volcanic rocks of the diorite class; but some geologists, who have visited the district, are inclined to the opinion that the schist is merely an alteration of the volcanic rocks caused by the shearing movement, which has produced a zone where the schistosity is extremely marked. The fact that the schist, even where closely associated with the ore, carries no barium sulphate, and again, that the line of demarcation between the schist walls and the ore is so well defined,—in mining the transition from barren country rock to ore of shipping grade is sudden and complete—precludes the theory that the origin of the ore is from lateral secretion. In fact from a consideration of all the conditions surrounding these ore bodies it would appear as though the ascension theory would best explain their origin.

Class 5 refers to pyrrhotite ore carrying low copper values, sometimes in a gangue composed of a high percentage of epidote, garnet, amphibole and some calcspar, either in fissures in basic igneous rocks, or else at the contact of crystalline limestone or igneous rocks. Examples of this class of ore deposits are relatively numerous, and, apparently, the ore bodies are of much greater extent, although lenticular in structure, than those belonging to any other in the series under discussion in this paper. Whether any of these ore bodies will be proved to be of commercial value has yet to be determined. The values contained in the pyrrhotite at or near the surface have almost invariably been so low that operators have hesitated to carry on developments to any considerable extent; and I am not aware of any ore body of this class on the Coast or the islands adjacent thereto, on which development has been carried to a point to demonstrate commercial value. The old theory that values improve with depth has been so thoroughly exploded, especially with regard to the occurrences of copper ore, that, at the present day, capitalists will scarcely consider a property unless the outcroppings carry fair values. I do not wish to be included among those who hold to the theory that ore bodies increase in value at depth, when this hypothesis is advanced to establish a rule, but there are occurrences, and one of those is the Robertson-Beatson property on La Touche Island, where a zone of second-

dary enrichment occurs at a depth of about 70 ft. below the apex of the outcroppings, and this zone is known to extend to over 100 ft. deeper.

There is one rule noticeable in all the occurrences of pyrrhotite outcroppings, *viz.*, that surface waters percolate through the pyrrhotite freely and where this ore carries even low copper values on the surface, it does not require any great stretch of imagination, to conclude that values have leached out and been carried downward with the percolating waters.

Extensive bodies of this class of ore are known to occur on the west coast of Vancouver Island; on the mainland near the head of Jervis Inlet, British Columbia; as well as on the mainland along the Alaskan Coast; on Prince of Wales Island and Knight Island and Prince William Sound. The same condition in respect to lack of development is applicable to all these localities; but the time is not distant when a market for this ore will be created by the smelters for fluxing purposes, and possibly by powder works for the manufacture of sulphuric acid. This should result in a settlement of the question whether the copper values in this class of ore increase at some depth below the zone to which the surface waters percolate.

One feature in connection with pyrrhotite ore on the Pacific Coast is worthy of note, *i. e.*, that unlike the pyrrhotite found in Sudbury district, Ontario, it carries no nickel values, and, unlike the pyrrhotite ore in Rossland district, British Columbia, no appreciable gold values. Owing to these deficiencies and the low copper contents carried by the outcroppings, it is not surprising that so little development has been attempted on this class of ore bodies, notwithstanding their apparent great extent.

There are meanwhile certain characteristics general to all the occurrences of copper-bearing ore along the Pacific Coast. These are as follows: Garnets and epidote are almost always found associated with the copper ore and the presence of these minerals in the gangue is a sure indication of an occurrence of copper-bearing ore. It is not intended, however, to intimate that wherever garnet and epidote occur copper ore will be found, but that I have observed that wherever copper ore is found these minerals accompany it. Especially is this the rule in the case of bornite and chalcocite ores.

Another characteristic, very general with regard to occurrences, is the lenticular structure of the deposits and the absence of what may be termed "true leads." Even where copper ore occurs in veins, it is almost always found that the solid ore is in lenses in the vein matter. Of course, there are exceptions to this latter rule; in fact an occurrence at Maple Bay on Portland Canal, in British Columbia, may be taken as one, the chalcopyrite being there disseminated through the quartz ledge matter in small grains and crystals. About the same condition also occurs on a portion of the Britannia mine on Howe Sound, British Columbia, but there the mass of quartz carrying the mineral has itself lenticular structure.

LUCKY JIM MINE, SLOCAN DISTRICT.

An Expert's Description of One of the Largest Zinc Mines in British Columbia.

ZINC ORE MINING in British Columbia in 1905 was active enough to lead the provincial mineralogist to state, in his report on the "Progress of Mining" in the Province during that year made "Annual Report of the Minister of Mines for 1905," (p. J 22): "This year, for the first time, have any important sales of zinc ore to be recorded;" and to report further that: "Approximately 9,413 tons of zinc ore or zinc concentrates were sold, having a value at point of shipment of about \$139,200." From the "Report of the Zinc Commission," (p. 13), appointed by the Dominion Government "to undertake the investigation of the zinc resources of British Columbia, and their utilization," it is learned that in 1905 8,561 tons of zinc ore were shipped from the Province to the United States and that the actual production for that year was possibly 3,000 to 4,000 tons more than the shipments, but this additional quantity was largely held for treatment by magnetic separation for the enrichment of its grade in zinc.

Unfortunately this new and, for the time, growing industry was not long permitted to flourish, for early in 1906 the United States market was practically closed against its zinc product by an order of the secretary of the United States treasury, who ruled that foreign zinc sulphide and carbonate ores, previously admitted free, were dutiable at the rate of 20 per cent. *ad valorem*. This ruling has been reversed by the board of general appraisers so that, unless this recent decision shall be successfully appealed against, the United States market will hereafter be open to foreign zinc ores, included in the term "calamine," as used in the tariff and held as free of duty.

While there are numbers of mines in the Province, chiefly in West Kootenay, in which zinc occurs in association with lead, there are as well several which are essentially zinc mines. The best examples of these, according to the chief commissioner, W. R. Ingalls, are the Lucky Jim in Slocan mining division, and the Blue Bell in Ainsworth division. The accompanying description of the former, by Philip Argall of Denver, Colorado, U. S. A., to whom was entrusted charge of the field work in connection with the investigations of the Zinc Commission, is from the latter's published report, pp. 200-206. In view of the fact that the Lucky Jim has been, and will probably for a time again be, the largest producer of zinc ore of a shipping grade in British Columbia, the information herein given will doubtless be of interest to many. Mr. Argall reported as follows:

This property, situated at Bear Lake, is owned by G. W. Hughes and associate. It consists of 12 mining claims and fractions, aggregating about 350 acres. The Lucky Jim vein was discovered in 1892 and worked irregularly for some years for silver-lead ore; during the years 1896-1899 concentrating on

amounting to 5,641 tons was produced, from which 1,600 tons of zinc blende averaging 50 per cent. zinc was sorted out. The remainder, a zinc-lead product, was sold to the owners of the Pilot Bay concentrating and smelting works. The 1,600 tons of zinc ore assaying about 6 oz. of silver per ton, 3 per cent. lead, and 50 per cent. zinc, was shipped partly to Antwerp and partly to the Fry Process Works on the Manchester Ship Canal, England, a freight rate of \$14.50 per ton having been secured from the mine to those works, but unfortunately the works, the process and its inventor all came to grief about the time the ore arrived in England and the shippers gained nothing but experience by the transaction.

During 1901-2 the property was shut down, but it was reopened in 1903 by Mr. Hughes, the present owner, who has declared dividends of \$100,000 as the result of zinc ore shipments during 1904 and 1905.

The production under Mr. Hughes' management up to the end of 1905 amounted to 5,345 tons of zinc blende averaging 54 per cent. zinc, a small portion of the tonnage being concentrates from a trial shipment to the Payne concentrator at Sandon.

Development.—The property is developed by five tunnels, the uppermost (worked exclusively for silver-lead ore and now abandoned) being situated at an elevation of 4,551 ft. above sea level. The Slide tunnel, so called because its portal is situated on the side of the gulch, in the track of a large snowslide, is at an elevation of 4,474 ft. A second tunnel (Safety tunnel) was driven in at this same elevation from a sheltered point on the side of the mountain and connected with the workings of the Slide tunnel, so that the men can enter or leave the mine in safety when slides are running in the gulch.

Two tunnels, one on the east and one on the west side of the gulch, have their portals at an elevation of 4,366 ft. These tunnels (called No. 2) are connected with the Kaslo & Slocan railway by a gravity tram 1,300 ft. long, with a fall of 830 ft.; together with the branch levels they aggregate 3,000 ft. of drifts.

Geological.—The Lucky Jim ore deposit differs so much from the general run of the Slocan vein series, that a short note on the geological conditions is necessary to a clear understanding of the ore occurrence at this very interesting mine. In a word, the ore is found in a zone of limestone and calcareous slate where penetrated by fissures, and invariably in the purer crystalline limestone of the zone. The foot-wall of the limestone zone is a hard dark-green fissile slate, more or less pyritiferous near the plane of contact with the limestone. Impure quartzite beds occur in the foot-wall slates, but not in the vicinity of the ore deposits. The hanging-wall country, as seen in No. 2 tunnel, appears to be the average gray crystalline limestone of the Slocan vein series, and is supposed to be composed of about equal parts of calcareous slates, limestone, etc., that make up what I shall call the limestone zone. The pay ore occurs in the limestone zone, and the ore is the same as the

variably along some line of fissuring, or extending along the fissure in vein-like form, where limestone forms one or both fissure walls. The fissuring, like most of the Slooan series, is greatest at the present surface and becomes less in depth, the minor fissures often disappearing in less than 100 ft. from surface. These latter, however, are confined to the limestone zone, and are more properly called incipient fissures. The key to this ore deposit is, however, the east-west fissures crossing the strike of the limestone zone, and this fact should not be lost sight of in prospecting at the Lucky Jim, or other properties along the strike of the limestone zone to the south.

The Mine.—The Safety tunnel follows very closely the strike of the slates from its portal to the turn. The main fissure of the mine was intersected at this turn and followed westerly through the slates until the contact plane was reached. This fissure is a clear break in the slates, averages about 2 ft. in width and stands vertical. I could not observe any mineralization in the slates, the fissure being for the most part open, though here and there blocked by crushed slate. The drift followed the open fissure westerly until the limestone zone was reached, where ore was at once discovered in a chimney-like mass which was followed up to surface along the contact and stoped out, producing considerable lead ore. This upper stope extends near the surface from the main fissure across the Slide tunnel, and connects with one of four subsidiary fissures that occur in the west drift of this tunnel.

The Slide tunnel enters slate at its portal and continues in same until the limestone is reached. At this point a drift runs back in a northwesterly direction along the foot-wall contact plane, intersecting four parallel fissures in the limestone. These are small and usually tight, incipient fissures, which do not extend into the slate foot-wall, although they carry ore in the limestone, and in some places quite good bunches of ore. The first fissure is small and tight on the levels, but has been followed up by a stope which connects with the surface stope previously noted. The second fissure is also very tight in the drift, but as followed west, opened out, and from 20 to 32 ft. west of the drift contained good concentrating ore for a width of 12 ft. mostly a high-class blende. The third fissure intersected in this side drift is very small and apparently unimportant, while the fourth and last is the strongest of all. It has been followed through limestone 60 ft. from the foot-wall, at which point the hanging-wall slates are met with. Galena with some zinc blende occurs in this fissure for a length of 50 ft., and has been stoped in one place up to surface. These four fissures occur at intervals of 15 ft., making a definite though incipient fissuring or sheeted zone, confined, however, to the limestone which here has a proven thickness of 50 ft. A fifth fissure occurs at the junction of this drift with the main Slide tunnel, and the sixth and main fissure, previously traced through the Safety tunnel, is intersected at a distance of 110 ft. from the portal of the Slide tunnel.

The main ore chimney on the tunnel horizon has an elliptical shape measuring 50 ft. along the fissure by about 30 ft. greatest width. The sides of the stope show some galena and considerable blende disseminated in limestone, all of which would pay well to concentrate. A winze connects with No. 2 tunnel 100 ft. below, and some stoping has been conducted around the winze. The workings were, however, filled with concentrating ore and inaccessible. It looks as if the high-grade lead and zinc ore had been stoped, in part, leaving the concentrating ore to be removed later. This ore chimney, as represented by the stope, commences at surface with a thickness of about 6 ft., swelling to 30 ft. on the Slide tunnel level. The limestone is also thin at surface, about 20 ft., while at the Slide tunnel it is 50 ft. and on No. 2 tunnel about 30 ft. This ore deposit is undoubtedly a replacement of the pure semi-crystalline limestone, occurring near the foot-wall of the limestone zone, with high-grade lead ore near the surface, followed by lead and zinc ore of considerable purity, and, as will presently be shown, a considerable development of pyrites in depth, associated with a very fair grade of zinc ore.

This fissure I have previously referred to as the main fissure, because of its great length in the slate and limestone, and furthermore because a winze was sunk on it to the No. 4 tunnel, where it is very well defined and carries ore on its walls in the limestone. The rich ore has probably been very carefully stoped out from this big chimney, though there are, no doubt, many thousand tons of good concentrating ore to be obtained by further working around the periphery. At least, very good blende and galena ore, mixed with limestone and a little slate, can be seen around the workings on and above No. 2 tunnel level, while below that point the chimney is filled with broken ore, stored there until arrangements can be made for its concentration.

There are two adits on the horizon of No. 2 tunnel. I shall first deal with the one driven to intersect the ore chimney, last described.

The tunnel starts in on the southern side of the gulch and intersects the limestone-slate contact 200 ft. from its portal, after passing through slate for that distance. Near the contact the slate contains quite a large development of scattered pyrite crystals, which may be said to extend for about 20 ft. back from the contact. The pyrites is in form of cubes, and is best developed close to the contact. Passing inward along the tunnel, at a distance of 50 ft. from the contact the first fissure occurs. A drift has been opened 15 ft. to the east and a raise put up some distance. This fissure is well-defined here, and would appear to correspond with the most northern of the Slide tunnel series, which has been there drifted on for a length of 60 ft. Where cut on No. 4 tunnel, several good bunches of blende occur in the fissure and iron pyrites is somewhat plentiful in the limey rock adjacent to it.

On the west side of the tunnel at this point a drift was pushed in 10 ft. on a tight fissure. The lime-

stone in this neighbourhood is somewhat massive and dark-coloured, while 18 ft. further in along the tunnel a very distinct open fissure crosses, on the walls of which about an inch of calcite is found. The space between the calcite on the walls varies from half an inch to two inches. It is quite probable that this is a post-mineralization fissure. There is no change from this point until the main fissure of the mine is intersected at 380 ft. from the tunnel portal, along which the tunnel turns to the east and connects with the raise which passes up through the big ore chimney now stored with broken ore, previously referred to. This main fissure has been opened for about 15 ft. east into the slate foot-wall, on which the raise was started, and, so far as I can determine, it closely follows this wall until the winze is reached. In the face of the east cross-cut in this slate foot-wall on No. 2, the fissure appears small and tight, and would scarcely be recognized as the main fissure which passes so persistently through the slates on the Safety tunnel horizon. In the westerly direction, however, the fissure is very strong and has been followed for a distance of 160 ft., for much of the way through calcareous slate and bands of impure limestone, ending in the typical black Sloean slates, where the fissure is again practically closed. Ore occurs for a considerable distance between the points indicated, but to be more precise, at the foot of the main raise on the foot-wall there is 3 ft. of very fair blende next the fissure, with 5 ft. of rather light-coloured pyrites, associated with a little blende, followed by strong developments of calcite which continue southerly in the limestone to the next fissure. A third parallel fissure, small and tight, occurs at the bend of the level, along which no particular mineralization can be noted.

Passing westerly along the main fissure, the No. 2 tunnel was driven through the fissure and extended on its last course 40 ft. beyond it, ending in black Sloean slates. A raise was also put up in the main fissure, at this place, but was in no condition for examination. The ore in the fissure, however, gives the same section as at the foot-wall raise—3 ft. of blende and about 5 ft. of mixed pyrites and blende. The pyrites appears rather massive, and some of it looks like pyrrhotite, but on the whole, it would make good concentrating ore. Continuing westward along the main fissure, toward the hanging-wall of the limestone zone, the drift passes mostly through slate from the point of intersection of the main tunnel to the winze, though in this slate there are a few small beds of impure limestone. The left-hand side of the drift is deeply marked with striae, showing movement toward the hanging-wall at about 40 deg. dip. Limestone again occurs at the winze for a width of 15 ft., and in it there is a very fair development of pyrites, zinc blende and galena, the blende being more abundant toward the hanging, and indeed extends back along the northern side of the drift for 14 ft. from the winze, the blende being of the usual high-grade character of the Lucky Jim ore. This winze has not been unwatered since Mr. Hughes

purchased the property, but he informed me the drift inside of the winze was full of good concentrating ore when he took hold of the property, and he believes this ore was taken out of the winze, though it is just as likely to have been obtained from the raise. The ore, he stated, contained considerable galena and was a first-class concentrating ore. Beyond the winze the drift is entirely in slate, and ends, as previously noted, in dark Sloean slates, softer considerably than those passed through in other portions of the tunnel. Returning to the main raise on the foot-wall, it will be noted that the level after passing through the sheeted zone, previously described, makes a southerly bend and enters the slate. Passing onward for a considerable distance, the level was very hurriedly examined and the face found to be in slate, but near the face some impure limestone occurs. A westerly cross-cut passes through this band in the slate, and one to the east also ends in slate. One or two cross fissures occur in this drift, but no mineralization of moment was observed. From one fissure quite a stream of water was issuing, giving a black deposit, probably mangiferous.

While this drift south of the main fissure was not carefully examined, yet the irregular occurrence of the limestone and the fact that No. 2 tunnel, after intersecting the main fissure, passed through the limestone and into the slate, that between this point and the winze in the main fissure another slate mass exists, it becomes evident that the limestone is of irregular occurrence and is probably best understood, in part at least, as an accretion or segregation of limestone in the slates, the larger mass following closely one particular stratum of slate now represented as the foot-wall; in this limestone segregation mineral has been deposited in the main fissures of certain sheeted zones. The strike of the limestone zone at the surface can be traced for about 40 ft., when it passes under wash and debris and is lost from sight, but again crops on the point of the hill almost opposite the portal of No. 2 tunnel east. Here an open-cut was made and considerable lead and zinc ore shipped therefrom. In the sides of this open-cut three well pronounced fissures are observable, each one well mineralized.

Tunnel No. 2 west passed in through hard slate, which on nearing the ore deposit is pyriticiferous and the slate greenish, but on the tunnel horizon I was not able to observe any of the fissuring, the ore having been completely tipped out of the winze. Below the tunnel and the place filled with water. I was informed, however, that a winze was sunk about 70 ft. and followed ore for the entire distance, but at the bottom the ore was narrowing and following a distinct fissure. I believe the principal shipments from the Lucky Jim during 1905 came from this chimney, which roughly measures 65 ft. in length by 35 ft. greatest width, having the shape of a flat ellipse. The ore is very clean zinc blende, containing only a few stringers of iron pyrites, easily sorted out. Some of the crystalline blende has a resinous colour and occurs in very large crystals. Very little

hand sorting is required, as the ore is singularly free from waste or impurity, whole car-loads running 54 per cent. zinc as broken down in the stope.

No. 2 tunnel west, on passing through the slate-limestone contact plane, broke into solid zinc ore and followed along the basset edge of a very rough jagged slate, forming the northern boundary of the limestone and the ore chimney, which are practically coterminous, while the face of the drift is in slate which terminates the limestone in that direction. The slate is of dark green colour and pyritiferous. Here we find the curious phenomena of a pure crystalline limestone apparently interbedded with the slate, suddenly and abruptly terminating against a jagged slate wall, being as it were cut off on its strike. This could be more easily explained as due to faulting, but no fault fissure could be observed along the northern boundary of the ore deposit, while the limestone 2 in. from the slate assayed 53 per cent. CaO with no silica or magnesia present. On the south side of the chimney the ore has been stoped back into the crystalline limestone, while a drift passing almost at right angles to the general strike of the formation, shows the limestone zone to be 60 ft. thick at a point 70 ft. south of the centre of the ore chimney.

The shipping ore on the tunnel horizon and above is stoped out, and the workings in places are filled with concentrating ore, while the stope below the level was full of water, hence no thorough or satisfactory examination of the ore chimney could be made. However, it looks to me as if the limestone in which this ore chimney occurs is a sort of segregated deposit, or possibly a cavity in the slates filled with pure crystalline limestone. The limestone enclosing the other large chimney in No. 2 tunnel east appears to conform to the strike of the slates, at least adjacent to the chimney. It is also crystalline and a sample taken at the foot of the main raise, south side, gave on analysis CaO 53.4 per cent., SiO₂ 0.8 per cent, MgO nil.

The Lucky Jim ore deposits occur in a limestone zone in part interbedded with the slates. This zone consists of crystalline limestone of great purity, calcareous slates and dark impure limestone bands which in some places follow the strike of the slates and in other places are of irregular form, more particularly the crystalline limestone in which the two developed ore chimneys occur. The ore deposits occur in association with a system of vertical fissures crossing the zone at about right angles to its strike. The fissuring is best and largest near the surface and does not continue very strong in depth. Future prospecting should therefore take the form of developing the cross fissures at a shallow or moderate depth in the limestone zone. Moreover the shallow deposits carry galena and very clean blende, while in the deepest workings a fine grained pyrites and pyrrhotite occur in quantity, mixed with the blende, and hence the deep ores will require a concentration mill and magnetic separator to handle them effectively. The Lucky Jim mine should produce large

quantities of concentrating ore as well as the high-grade zinc for which it is famous. Further development along the strike of the limestone will in the fissured zones undoubtedly result in the discovery of other deposits of high-grade blende.

ON OPERATIONS IN THE ROSSLAND, B. C., MINING DISTRICT.

Official Report by R. W. Brock.

ROSSLAND MINING CAMP has during two field-work seasons been under detailed examination by R. W. Brock and associate officials of the Geological Survey of Canada. In the June, 1906, number of the MINING RECORD (pp. 219-239) there was published Professor Brock's "Preliminary Report on the Rossland, B. C., Mining District." As supplementary to that interesting and valuable report the following, giving further information relative to the mines of the camp and the work done by the Survey party in and about them, is reprinted from the "Summary Report of the Geological Survey Department of Canada for 1906":

The past field season was spent at Rossland continuing the survey of the camp begun last season, described in the "Preliminary Report on the Rossland, B. C., Mining District." The division of the work made last year was adhered to during the present summer, viz.: W. H. Boyd took charge of the topographical survey; G. A. Young mapped the areal geology, while the writer's attention was given to the veins and ore deposits. Six student assistants were attached to the party, all of whom advanced the operations by willing and intelligent services.

The instructions were to complete, if possible, the work in the Rossland district. Mr. Young succeeded in completing his task. Mr. Boyd finished his map of the area embracing the town and working mines, on a scale of 400 ft. to the inch, with 20-ft. contours, and the main portion of the map of Rossland and vicinity on a scale of 1,200 ft. with contours at 40-ft. intervals. He was forced to suspend operations for the season, with two or three weeks' work still uncompleted. This, however, can be finished next spring without delaying the publication of the map. My own work will require the same time to complete.

Operations were commenced early in May and suspended in the middle of October. The geological work was not confined strictly to the areas covered by the map sheets of Rossland but was extended in various directions, in the hope that some of the problems might be more easily solvable outside than within the complicated area in the immediate vicinity of Rossland, and in order to compare the outlying veins with those of the camp itself. With few exceptions all the workings that could be found, and that were sufficiently free of water to be entered, were examined, as well as a number of mineral claims lying outside.

Nothing was found to greatly alter the conception of the geological history of the camp given in the "Preliminary Report," published last year, so it

need not be repeated in this place. One of the most interesting and unexpected discoveries was that of a bed of fossiliferous stratified rock just above the O. K. mine. While considerably altered to calcite it is hoped that some of the fossils collected preserve enough of their original forms to enable the exact geological age of the rocks to be determined.

Exact figures of production cannot be compiled. As nearly as they can be computed Ross and his produced to January 1, 1906, 2,217,295 tons of ore containing 1,240,331 oz. of gold, 1,723,249 oz. of silver and 60,753,330 lb. of copper, together valued at about \$34,879,239. This year's (1906) production will be seriously affected by the slackening of shipments by the Centre Star while alterations were in progress, which occupied almost half the year, and by a shortage of coke at the smelters occasioned by the strike of coal miners at Fernie. From this cause the Le Roi Company, which had intended to operate its Northport smelter, in addition to shipping to Trail, was obliged to postpone the blowing in of the Northport furnaces.

During the past year, development work in the mines has been pushed more vigorously than formerly with the gratifying result that more ore is now in sight in each of the mines than had previously been for many years.

In the Le Roi work has been largely, but not altogether, confined to the South lode opening up large ore bodies on a number of levels, from the 300-ft. down. Hitherto the workings on the Le Roi had been confined to the ground east of the Josie gulch from about the Josie shaft to the Le Roi stores. Levels are now being extended on the Le Roi west of this dyke and good ore has been encountered. This opens up considerable possibilities in extensive but hitherto untested ground. The winze from the 1,350-ft. level has been extended to the 1,750-ft. On the 1,650-ft., the last developed level, the main drives are almost altogether in heavy sulphides. These lower levels will be extended and worked when the shaft has been sunk to them, which work is now in progress. The North and Main lodes are also receiving some attention.

In ground so extensively mineralized as the Le Roi the whole of a lode from end to end and from side to side is worth prospecting; a narrow drift along it, a narrow slope on it, or a very occasional cross-cut or drill hole, by no means exhausts the possibilities. On the South lode there are large areas as yet totally unprospected and on the Main vein there is a great deal that has not been wholly tested transversely. This with the ground west of the Josie dyke and the deep levels gives a large extent of territory with first-rate possibilities.

The geological work in the Le Roi showed a very large number of the ore shoots to occur along the contact between the augite-porphryrite and the tongue of granitoid rock which lies between the Main and South lodes. A dyke of quartz-bearing porphyry occurs in or near the latter lode on a number of levels of the Le Roi and also on the South

lode at the Centre Star. It may be assumed to occur as an outlier.

The Consolidated Mining and Smelting Company of Canada in addition to work on the upper levels has devoted much attention to the deep levels of the Centre Star and War Eagle. The shaft of the former has been continued from the tenth to the twelfth level. It is encouraging to note that the eleventh level, the deepest developed level in the mine, promises to prove better than any level since the 50-ft. One sill floor had been cut out to a width of 48 ft. in pay ore. On the War Eagle, beside prospecting on the upper levels where some new shoots have been located, work on the newly-found downward continuation of the War Eagle vein has been in progress in the ninth, tenth and eleventh levels. Three cross-cuts from the War Eagle to the Centre Star shaft have been run to enable the two mines to be operated from that shaft.

A new 1,100-h.p. Nordberg hoist, with a capacity of 1,350 tons per ten hours from 3,000 ft. is being installed, and in the new hoist house, a sorting and sampling plant will be placed. The compressors from the War Eagle are being placed with the Centre Star and all will be electrically driven, so that hereafter the two mines will be one with one headworks and shaft.

The Iron Mask mine, lying north of the Centre Star and in the obtuse angle between it and the War Eagle, has been acquired by the Consolidated Mining and Smelting Company and preparations are being made to operate it through the War Eagle.

On the Le Roi No. 2 the most interesting and important development has been the exploration of the Hamilton vein on the 500-ft. level. This vein has been followed continuously for a distance of over 1,200 ft., most of which, it is said, will be extracted, and much of it is good grade ore. Near the surface this promising vein is far below grade and even to the 300-ft. level it is not up to the mark but below this the values come in. This mine is the only one with extensive workings west of the Josie dyke, but from it a large quantity of ore has been extracted. The Poorman vein on the Josie claim is also being operated.

The Jumbo mine, after having been operated several years and having shipped about 30,000 tons, has been shut down, the known ore having been extracted.

The Crown Point was operated for a few weeks and shipped a little ore but as the ore gave out a short distance below the surface, work was suspended.

The White Bear, on the other hand, is again in operation, principally on development work, although ore extracted in this work is being shipped.

There is some prospect of several other properties being re-opened.

Outside what may be termed the central area, that occupied by and adjoining the working mines, there are a large number of veins. In some of them a little high-grade ore has been obtained but the ma-

jority are low-grade or have shown so far as developed only small amounts of good-grade material.

In the stratified rocks, while some veins have good surface showing, they have failed to maintain their strength and values downwards and the numerous slips in these rocks make it difficult to follow them.

Two main types of veins occur outside the central area, which, however, may grade into one another, *viz.*, those that consist largely of pyrrhotite with small amounts of pyrite, chalcopyrite and other sulphides, and those that have as conspicuous constituents some of the minerals arsenopyrite, pyrite, molybdenite, galena, blende, bismuthinite, garnet epidote and quartz. These obtain both to the north and west and in the South Belt. West of Little Sheep Creek quartz veins with some sulphides are common. The O. K. and I. X. L. furnished very rich gold quartz ore from a vein in serpentine but the vein does not reach the lowest level.

The attempt made to map the veins of the camp was not very successful. Veins are too numerous, too much alike, exposures are too frequent, and small faults too plentiful to enable one to interpolate between outcrops. It was decided that it would be more useful to simply mark the exposures with a line sufficiently long to indicate the strike of the vein at that point, except where there can be no doubt as to the identity of the vein. The map will suggest the co-relation of the exposures, and anyone interested may test the verity of his conclusions by trenching. Plotting the outcrops, however, as well as the development work in the mines emphasizes the fact that there is a large number of veins, and that they are more persistent than had been expected. This is true also of the ore shoots to a much greater extent than was formerly supposed.

It is evident from early workings that two mistakes of an opposite character were liable to be made; either too great regularity was expected or none at all. Either of these mistakes was fatal. There is enough regularity to make it safe to conclude that when a well-marked typical vein disappears, it has been faulted, and when an ore shoot fails to appear at the expected spot, a change of dip or a horizontal heave is sufficiently probable to make a thorough search advisable. In early work prospecting was often stopped by a fault of the dyke, or if continued the drive was frequently turned along the fault plane, the worst possible place to look for information.

Almost all the veins strike either nearly east and west or northwest and southeast so that when only a limited exposure is to be seen it may fairly be presumed that the vein strikes it in one of these directions.

It is a noticeable fact that with few exceptions all the claims which have attracted attention in the South Belt as well as in the north, lie very close to the contact of the monzonite or gabbro mass. Ground near this contact would therefore appear to be particularly favourable for prospecting.

Starting with the South lode of the Le Roi-Centre Star, there are at least seven veins that are producing ore—and possibly more. From the War Eagle to the Cliff there are four well-marked ones.

Unfortunately there are few rock exposures south of the South lode, but the monzonite contact lies somewhere south of it. Since the conditions southward seem as favourable as northward of the South lode, it is scarcely likely that the great ore bodies of this lode have so much ore to the north of them and none to the south. It is less unlikely to suppose the Le Roi-Centre Star Main and South lodes are the central and perhaps the most important members of a co-ordinate system of veins. That there is some mineralization in this ground is shown by the Nickel Plate workings, cuttings on the Red Mountain railway, and by the Spitzee veins. The sheared and mineralized rock of a lode would weather and erode more rapidly than unmineralized country rock and might very well be covered with wash in a gulch. The heavy mantle of wash that covers most of the ground has prevented prospecting, so that as yet it is mostly virgin territory. Its prospecting will be costly, but adjoining as it does ground of such proved richness, and possessing so far as may be presaged, favourable geological conditions, the chances for success are sufficiently strong to render its exploitation a good business venture. The most favourable point to test it would be in the neighbourhood of the Josie dyke.

The work on the Le Roi No. 2 west of the Josie dyke proves mineralization to have extended a long distance in this direction. That on the Le Roi proves that the veins east of the dyke may be expected to continue west of it. From about the boundary between the White Bear and Black Bear the contact between the ore-bearing and the stratified rocks extends northward, all west of this being stratified rocks. The workings of the White Bear show the thickness of these rocks to be 500 ft. and that they overlie ore-bearing rocks. There is reason to believe that elsewhere along their eastern border their thickness does not exceed a few hundred feet and that they overlie augite-porphryite concealed by the mantling stratified rocks. In time other companies beside the White Bear may explore these underlying rocks.

Excepting on the St. Elmo-Cliff vein, little has been done on the veins mentioned north of the White Eagle No. 1, outside of a few prospect shafts. Nothing has been produced and only a few good assays are reported, but it may at least be said that the surface showings are as good as they are on the Hamilton vein of the Le Roi No. 2 which is developing so well on the 500-ft. level.

Some good ore has been taken from the Consolidated St. Elmo, Cliff, Monte Christo, Evening Star, and from C. and K. The main lodes of the Centre Star are mostly drift-covered east of the Centre Star gulch, and have not been prospected except by a shaft on the Enterprise which is in heavy sulphides. Between this and the Monte Christo vein are several

veins with massive pyromorphite low into chloropentite showing.

The South Belt has several veins. The Horse-shoe, Gopher, Cattie Queen and perhaps the Green Point appear to be on one continuous vein. Some of these South Belt veins had good surface showings, yielding high return, but development work does not seem to have opened up good ore shoots that have continued downwards. Recent work on the Crown Point revealed the disappointing fact that its strong ore body suddenly gave out some 20 ft. below the surface, the transition between ore and unmineralized rock occurring in a space of less than 2 ft. Few of the workings on the South Belt could be entered, and most of it is concealed by wash, so that little can be said of its possibilities. Since the covering of wash which makes prospecting difficult might conceal some good ore, it is unfortunate that the work already done on this belt should offer so little encouragement to prospecting.

While there is ground about Rossland that is well worth prospecting, this does not mean that such ground is worth a high cash price; for the testing of it is very costly and may bring in no return for the money invested. The owner should be willing either to take a small cash payment or if he has so much confidence in his claims, to give a bond on it for a guarantee that the work will be done.

The temperature of the rocks at various levels in some of the mines was taken to determine the increase with depth. Clinical thermometers were fitted with wooden handles 4 ft. long with openings to permit reading and to leave the bulbs free. The measurements were taken in drill holes in cross-cuts where there could be a minimum circulation of air. The thermometer was immersed the length of the handle in the hole, and at first the mouth of the hole was plugged, but it was found that no difference in readings resulted when the holes were left open. The readings for similar levels below the surface agreed remarkably well. From the surface to 150 or 200 ft. the temperatures regularly decreased to 41.75 F. From here the temperature rises rapidly for a few hundred feet, then more slowly, and for the last few hundred feet more rapidly again. The highest temperature in the 1,750 ft. level of the Little Star is 17.6 F. The rate of increase from the lowest temperature to the highest is 1 deg. per 47.7 ft. The lowest increase—between the fourth and tenth levels of the Centre Star—is 1 deg. every 53.7 ft., and the highest rate of increase between the 10th and 11th levels of the Centre Star, 1 deg. every 34 ft. That the temperature should decrease for such an unusual distance below the surface may perhaps be due to the chilling of the rocks by the Cordilleran glacier. If this is so the increment of increase shown below the cold zone will also be affected and be lower than it should be. As it is, the increase 1 deg. in at most 50 ft. is higher than that observed in most regions. The average given by the Commissioner of the British Association in 1889 is 1 deg. for every 64 ft. and this appears high in the light of subsequent observa-

tions. In Central Mexico, California and Idaho, in 1883, 1884, and 1885, 1 deg. in 60 to 62 ft. in Mexico, 1 deg. in 223.7 ft. In the Simplot tunnel, 1 deg. in 90 ft., varying from 1 deg. in 240 ft. under mountains to 1 deg. in 30 ft. at the surface. The increase of increase in Rossland may perhaps indicate comparatively recent volcanic activity, or some comparatively recent volcanism.

Dykes at different levels show the effects of heated waters being bleached in much the same way as rocks by the solfataric action of volcanoes. But the present mine waters have a lower temperature than the rocks except in the cold zone near the surface. On the intermediate levels, water entering from fractures or diamond drill holes may be 5 degrees F. lower than the rock temperature. On the eleventh level of the Centre Star about 1,300 ft. below the surface the water is only 1 deg. lower. This is the lowest level on which mine water could be examined. While lower in temperature than the rock, its unusually high content in mineral matter, particularly in the chlorides, and carbonates of alkalis and alkaline earths and in silica, would lead one to expect it had come from a region of higher temperature. There is some evidence of the action of this water on the vein on this level with an unusual development of copper ore at certain places.

An area of serpentine occurs on Little Sheep Creek on both sides of the valley in the vicinity of the O. K. mine. In some places veinlets of asbestos are developed. The quality is excellent but the veins are too narrow and small to be of any economic interest. With the view of testing this rock for platinum, samples were taken, pulverized and concentrated by panning. In this way a fairly large amount of rock could be tested. The creek bed was also washed at favourable points between Silica and the O. K. mine. Two small nuggets were found which resembled platinum. Others should be found in the concentrates that have not yet been treated. The sample of the creek concentrates assayed by Mr. Connor of the Survey yielded nothing but a little gold (\$37 per ton). Concerning the assay of serpentine concentrates, Mr. Connor reports: "0.0083 oz. gold per ton, 0.0001 oz. platinum per ton." Mr. Connor for the question mark after platinum is that the amount is so small that I took on a small piece of the same platinum. On the other hand the gold and platinum concentrates had a somewhat lustrous appearance of the gold colour, and were somewhat brittle. Also on alloying this gold and platinum residue with silver and dissolving again in nitric acid (for solution of the platinum), the residue gold was much more natural in colour and softness and weighed less, as expected. From this loss of weight I have given the figure for platinum."

A few miles north of Rossland, between Murphy and Sullivan Creeks, on the Lord Roberts claim, is a type of contact deposit from which is emerging the Boundary Creek type of contact deposit in the immediate vicinity of Rossland. The country rock could not be seen but it must be close to the contact

between the Nelson granodiorites and the Rossland volcanic group angite-porphyrity with stratified rocks including limestone. The deposit has been disclosed by a few open cuts for several hundred feet. Its width must be more than 30 ft. The upper trench shows a fine-grained micaceous syenite porphyry along the hanging wall. Bluish massive magnetite with a little chalcopyrite distributed through it as in the Boundary, pyrite, pyrrhotite, hornblende, epidote garnet, feldspar and quartz were detected. A small pegmatite dyke was also seen in the ore. The hornblende is soft and black like that found in the Josie and Black Bear shoot of the Le Roi. Magnetite and pyrite are most abundant near the footwall and pyrrhotite and chalcopyrite near the hanging wall but specimens may be obtained showing all four iron-bearing minerals, sometimes arranged in bands.

Specimens and descriptions furnished by prospectors indicate that other deposits of a similar nature are found in the neighbourhood of Rossland, particularly in altered limestone, at the head of Murphy Creek and in Big Sheep Basin.

of construction work to be undertaken during the ensuing summer, viz., the erection of a mammoth steel flue chamber involving the purchase of 250 tons of steel, the order for which has just been placed in the East. Manager A. B. W. Hodges states that he has been considering the matter and the present seems an opportune time for pushing on with this work. There are many reasons for this conclusion. Years ago when only four furnaces were being operated the draught was none too good and although in 1905, when the new 150-ft. smoke stack was built, things were bettered to some extent yet additional furnaces and extra converters have proved that the present flue chamber, which is about 10x10 ft. inside measurement, is not sufficiently large, and Mr. Hodges is determined to solve the question in a manner that will admit of even further furnace enlargement. In addition to the question of draught that of room is a serious one, so it is proposed to elevate the chamber 22 ft. above the feed floor, thus giving ample room underneath for the electric trolley wires which run from the ore bins to the furnaces. For



Granby Smelting Works at Grand Forks, B. C., showing Circular Smoke Stack 150 ft. high and 13 ft. inside diameter, and Flue Chamber 800 ft. long, both built of Brick.

A LARGE STEEL FLUE CHAMBER.

Important Improvements to be Made at the Granby Co.'s Smelter.

A STEEL FLUE CHAMBER of large size is to be erected at the Granby Consolidated Mining, Smelting and Power Company's smelting works at Grand Forks, Boundary district. The following description is from the *Grand Forks Gazette*:

Scarcely has the erection of the big steel furnace building at the Granby smelter been finished before the announcement comes of a new and costly piece

some time past there has been trouble around the furnaces with gas, smoke and flue dust; a flue of this type will do away with this. Beside considerable economy will be effected in the handling of the flue dust itself; also the top of the furnaces should be kept decidedly cooler.

Under the present arrangement the dust is continually accumulating near the entrance of the down-take pipes and has to be raked out and removed in hand buggies to the briquetting room. In the new flue there will be 28 hoppers and conveyers will run by cable down the length of the flue, with auxiliary conveyors to take the dust to the briquette mill, these

probably handling at the rate of 50 tons per hour.

The new flue chamber will be one of the best of the rectangular type and will be 13 ft. wide by 10 ft. high, inside measurement. It will be supported by steel columns resting, on the west side, on the same retaining wall as the existing supports of the furnace building, and on the east side on concrete piers. The length of the flue will be about 313 ft., practically the length of the furnace building and it will communicate at each end with the old brick flues which will be enlarged to meet the requirements. A special feature of the design is that all bracing will be on the outside. A light roof will surmount the flue for the purpose of protecting it from moisture, and to aid in bracing the top. The steel for the sides will be $\frac{1}{4}$ -in. and for the top 3-16-in. Roughly estimated the cost will be about \$25,000.

The downtake pipes from all the furnaces will be taken through the east side of the roof of the furnace building, the highest point of the downtake pipe being higher than the peak of the building, and the pipes will enter the flue chamber at the top. A saving of room will be effected below where the old brick flue will be torn out. It is hardly likely that the steel will be delivered at the works before July and it will take some three months thereafter to accomplish the work planned, but all being well this important new construction should be finished well before the end of the current year.

In the introduction to his official report "On Operations in the Rossland Mining District," R. W. Brock, of the Geological Survey of Canada, who during the field-work seasons has had charge of the survey of Rossland camp, observed: "It is probable the Survey accomplishes most, from a practical standpoint, by furnishing directly to those entitled to it, any information gained regarding a property. Such information, while it may be of value to the individual or company, may not possess any general interest and may therefore not be utilized in a report. While the direct benefit resulting from a survey of a mining camp may lie largely in what may be accomplished in this manner, it is usually of such a nature that the results cannot be made apparent to the public, so are, on this account, likely to be overlooked. Where possible, such information was given to those on the spot. Where this was not done it may be furnished, if applied for by the owners of a property examined."

The Gulf of Georgia Quarry Company intends cutting a considerable quantity of stone this spring. Its new machinery has all been installed at the quarry at Bigg's Point, and active operations will shortly be commenced. The company has an unlimited supply of rock to cut from, says the *Nanaimo Free Press*, and in view of the extensive building operations going on in the Province, rock will be in demand. The Northwestern Construction Company's quarry on Newcastle Island is getting out large quantities of stone for Vancouver contracts.

LE ROI NO. 2 MINE

LE ROI NO. 2 MINE, one of the best developed Columbia mining companies also occupies an honorable position in the London mining and financial press. While the property is one of the largest of the Rossland mines, in point of size of ore bodies and quantity of ore produced annually, it is also one of the best graded (that is general) in the Rossland camp. Formerly, the mine has been had the advantage of fully capable management, which has persistently carried out a well-considered plan of development, with satisfactory results, as shown in the summary of the annual report to the shareholders printed elsewhere in this number of the *Miner's Record*.

The following comment recently appeared in the *London Morning Express*:

At the meeting of this company, the board had a satisfactory state of things to present to the shareholders. With the dividend now sanctioned, 6s. will have been paid in dividends for the past year, and the chairman was able to hold out the hope that a similar return would be continued. The costs, which were \$4.22 per ton last year and \$4.45 in the preceding, have been reduced to \$3.85. This is partly due to a fresh contract with the smelter at Trail, under which the smelter charges have been lowered to \$6.12 per ton, against \$8.07 last year. A good deal of ore has been located during the year in the No. 2 mines, and their position is said to be better now than ever before. Some questions of general interest came under discussion. In the first place, the company has been acquiring what are called "outside interests," having taken an option on the Vancouver group of silver-lead mines in the Slovan district, British Columbia, and also an interest in the Cloncurry Syndicate, which was the parent of the Queensland Exploration Company. * * * * *

The directors seem to have made a very good start with the Cloncurry Syndicate and the Queensland Exploration property, and this success will probably ensure them offers of further profitable business. The shares of Le Roi No. 2 are of £5, and a proposal to subdivide into £1 shares was put before the meeting, which rejected it on a show of hands. Splitting is a good deal out of fashion; it makes shares more marketable, and therefore tends to strengthen the price. But for that reason it has been frequently adopted in order to facilitate large sales by insiders, and the public now looks upon a proposal to split as a notice that the insiders want to clear out, and as a warning of a coming fall in the shares. Splitting would not have affected the capital account of the Le Roi No. 2, and if the directors are going into financial business the value of the assets in relation to the nominal capital will be matter for consideration if dividends are to be paid. Nor would splitting have prevented the shares from standing at a discount, and it is an inconvenience for a financial company to have its shares at a discount. For these reasons we should not be surprised if the directors of

Le Roi No. 2 reorganized the company. It would not, we think, be difficult to present a scheme which would adjust the capital account and raise the value of the shares.

DOMINION COPPER COMPANY, LTD.

A Progressive Copper-Producing Enterprise.

MINING AND SMELTING copper ore in the Boundary district is shown to have been successfully carried on during rather more than a year over which period the operations of the Dominion Copper Company, Ltd., of New York, have extended. The *Boston Commercial* has published a review of the company's activity and results therefrom, as follows:

The condensed statement of the Dominion Copper Company, Ltd., for the first 13 months of operation under the Samuel Newhouse management and covering the period December 1, 1905, to December 31, 1906, shows net profits from operation of \$297,319. This showing was made with a total smelter capacity of about 600 to 650 tons per day, which capacity is now being increased to 1,500 tons per day by the installation of a new furnace, which is the largest copper-smelting furnace in British Columbia.

The furnace will be fed mechanically by side-dumping steel cars, drawn by electric locomotives. Before being fed to the furnaces, the ore is crushed in a mammoth crusher, of the same pattern as that in use at the Granby mines. After being crushed it is hoisted in a bucket elevator to the bin floor, where it is dumped on a link steel belt conveyor. Under this arrangement the handling of ores from the ore car to the furnace is automatic, and will result in a large saving in labour. The entire smelter plant will be operated by electricity.

During the 13 months (December 1, 1905, to December 31, 1906) the Dominion Copper Company has operated, practically, during a period of construction. When Samuel Newhouse took hold of the management, a comprehensive plan of development and construction work at the mines and smelter (to a capacity of 1,500 tons of ore per day) was outlined, and the inauguration of this new furnace completes the plans then made.

The first report made to the present management by M. M. Johnson stated that with these improvements completed, and the output increased to 1,200 tons per day, the Dominion Copper Company could realize net profits of \$1.25 per ton of ore mined, with copper at the low price of 13 cents per lb.

It is expected that with the new furnace running, the company will produce 9,000,000 lb. of copper per annum, at a cost of about 8 cents per lb. With copper at 18 cents this output would show net earnings of \$850,000 to \$900,000, which would allow the company to provide for all fixed charges and sinking fund requirements, and leave 14 per cent. earned on the par value of its capital stock.

With copper at the present price, 25 cents per lb.,

and every indication that it will remain at that price, or sell higher, for the balance of the year, the net profits would be over \$1,500,000, which would show net earnings of 26 per cent. on the par value of the company's shares, after allowing for all fixed charges and sinking fund requirements.

It is believed that these figures as to amount of output are conservative, as during the past 13 months the company has produced 4,405,000 lb. of copper, with a total smelting capacity of only 650 tons of ore per day and working under the disadvantages of a remodelling of its smelter plant.

Development work at the mines also has been pushed, so that the ore reserves will be ample for the increased smelter capacity. During this time, a complete plan of development of the company's Rawhide and Idaho claims has been followed, and these two properties, which one year ago were hardly touched, are in shape to furnish 1,000 tons of ore per day.

Up to the present time a large proportion of the 600 tons of ore per day smelted has been taken from the Brooklyn and Sunset. Both these properties will continue to contribute their quota. The company is also doing development work on its Crown Silver and Athelstan properties. The ore reserves now in sight are sufficient to give the company a capacity of 1,500 tons per day for several years to come.

The capitalization of the company is \$1,000,000 bonds, and \$5,000,000 stock in shares of \$10 par value, making it strong financially. When all its improvements shall be completed and paid for, the company will still have over \$700,000 on hand in cash, so that it will be justified in at once going on a dividend-paying basis.

In a brief report covering the operations of the company during the 13 months mentioned above, M. M. Johnson, the company's consulting engineer, gives the following details:

Tons ore mined.....	226,560
Cost of mining and freight, per ton.....	\$1.70
Assay value of ore:	
Gold	\$1.23
Silver	0.22
Copper, per cent.....	1.16
Tons ore smelted.....	225,946
Smelting, cost per ton.....	\$1.71
Copper produced.....	Lb. 4,405,552
Average profit per month.....	\$22,871
December profit.....	\$24,603

The last of the material for the new furnace was received at the smelter January 25, and as soon as installation can be completed it will go into operation. Mr. Johnson says the completed smelting plant will be a most economical one, and that the company should be able to handle even 1 per cent. ore at a profit.

The outlook for the zinc industry is again encouraging, the United States market, for the greater part of last year practically closed against them, having been reopened to British Columbia zinc ores.

COMPANY MEETINGS AND REPORTS.

BRITISH COLUMBIA COPPER CO., LTD.

The New York *Commercial and Financial World* has published the following information relative to the British Columbia Copper Company, Ltd., which recently held its annual general meeting in New York:

"According to an official announcement just made, Colgate Hoyt has been elected president of the British Columbia Copper Company, Ltd., succeeding F. L. Underwood. At the same meeting Newman Erb was elected chairman of the board of directors, B. B. Lawrence, an expert mining engineer of wide reputation, and F. L. Sommer were elected vice-presidents, and R. H. Eggleston was elected secretary and treasurer. B. B. Lawrence, Edwin Hawley and C. A. Starbuck were elected members of the executive committee, together with the officers.

"The British Columbia Copper Company is one of the strongest and most important organizations operating in the British Columbia region. It was organized in 1898, under the laws of West Virginia, with a capital stock of \$2,000,000, in shares of the par value of \$5 each, which sum has recently been increased to \$3,000,000. The company owns copper mines at Greenwood, British Columbia, with adjacent properties, and is actively operating them. Important improvements have recently been completed in connection with its furnaces and operating plant. It originally had two furnaces and an operating plant and last year were added three modern furnaces, having a daily capacity of about 700 tons each, or about 2,000 tons in all. Various other improvements have been made, so as to bring the plant up to the highest degree of efficiency. It is expected that the company will now be able to produce refined copper at about 8½ cents per lb., and, with two furnaces and at the present price of copper, be able to earn approximately \$1,000,000 net per annum, to be increased when all three new furnaces shall be in operation.

"The company has also acquired considerable additional mining property of great promise.

"For the future the outlook is highly encouraging, and it is expected that the payment of dividends will have to be recorded in the near future.

"Large expectations are entertained of the new administration. Mr. Hoyt brings to bear great experience in connection with the handling of important railroad, financial and industrial interests. He is United States trustee of the Netherlands Fire Insurance Company, and director and trustee of other important corporations."

On February 14 the company issued the following circular:

"Under authority conferred by the stockholders and the board of directors of this company, stockholders of record upon the closing of the transfer books at 3 o'clock p.m., on Wednesday, February 20, 1906, will be entitled to subscribe for new shares on the basis of 30 per cent. of their holdings at that time and date, at the rate of \$5 a share, payable as follows: \$2.50 per share March 11, 1907; \$2.50 per share May 10, 1907.

"Colgate Hoyt & Company, of No. 36 Wall street, New York City, have been appointed fiscal agents of the company, for the purpose of receiving the subscriptions to the new stock, and all moneys payable to the company upon all such subscriptions shall be paid by the subscriber or his assigns, to said Colgate Hoyt & Co., at their office in the City of New York in conformity with the terms of the subscription.

"Upon the closing of the transfer books on February 20, 1907, Colgate Hoyt & Co. will issue appropriate warrants, specifying the number of full shares to which each stockholder is entitled to subscribe. Separate warrants will be issued fractional shares. The right to subscribe will expire on March 11, 1907, at 3 p. m. In case of default by the subscriber, or his assigns, in making any

any terms or conditions thereof, all rights of the subscriber or his assigns, shall cease.

B. C. STANDARD CO., LTD.

A meeting of shareholders in the B. C. Standard Mining Company, Ltd., (in liquidation), which owned and for some time operated the Hunter V. and Double Standard group of mines near Ymir, Nelson mining division, was held at Nelson on February 13, when the official liquidator, George R. Player, submitted his report for the period from December 21, 1905, to January 31, 1906.

The liquidator stated that the liabilities of the company on December 21, 1905, were \$15,443.06, and the accounts collectable \$204.36. An arrangement was made by some of the directors with William Fernie, of Victoria, B. C., whereby he was to lend the company \$5,000 to liquidate all the small accounts; \$4,000 of this has been received and the liabilities reduced by \$6,066.61, the sum owed now being \$9,504.30, exclusive of the Fernie loan. This, however, includes \$127.85 interest on notes which were in force at the time the company went into liquidation and which it was necessary to renew. The majority of the unpaid accounts bear interest which so far has not been computed. This will amount to \$1,250, approximately. The mine had been leased and since December 21, 5000 tons of ore have been shipped from it, the total value having been \$16,845, on which royalties amounting to \$2,572.16 had been received. After paying the amount above-mentioned to the creditors and sundry items in connection with liquidation there is a balance on hand of \$313.30, as shown by the following cash statement:

Dr.	
To Royalties received	\$2,572 16
" Transfer fees	2 50
" Accounts collected	127 37
" Loan, William Fernie	4,000 00
	<hr/>
	\$6,657 03

Cr.	
By Amounts paid to creditors.....	\$6,666 61
" Miner's licence to May 31, 1907	100 00
" C. P. R. Telegraph Co., cables	33 67
" Lay and Fassett, experimenting re cyanide ..	65 00
" Interest and exchange	14 50
" Stationery, postage, box rent, etc.....	42 60
" Advertising	15 35
" Horse hire at Ymir	6 00
	<hr/>
	\$6,657 03

The shareholders are no doubt aware that the tramway was partially burned in August, but has been rebuilt and is now practically in better shape than when the company went into liquidation.

The report was accepted and the meeting adjourned.

LE ROI NO. 2, LTD.

At a general meeting of shareholders in the Le Roi No. 2, Ltd., held in London, England, on February 4, the engineers of the company reported that they have had charge of the property for four years, and that the year 1906 was the most profitable, as \$242,200 in profits was remitted to the London office. Beside this \$15,754 was spent in developing the Vancouver mine in the Sheshaan, or the net profits would have been larger by that sum.

The directors in their report for the year ending September 30, 1906, state that the audited accounts show a balance to the credit of profit and loss of £41,603 14s 3d on the operation of the company for the year, after writing off the sum of £13,125 17s 10d against mine explora-

tion and development, and £3,175 14s 5d as depreciation on machinery, mine, plant, etc. After paying the final dividend for the year ended September 30, 1905, there was brought forward the sum of £20,701 0s 2d, with which the present balance of £41,603 14s 3d gives a total of £62,304 14s 5d available for distribution. Out of this dividends totalling 5s per share, free of income tax, absorbing £31,500, have been paid, leaving £30,804 14s 5d to be carried forward. The directors recommend a final distribution for the year of 1s per share, free of income tax, leaving the sum of £24,504 14s 5d to be carried forward to next year. (The recommendation of the board of directors as to paying the dividend of one shilling a share was carried out, this making a total of 6s—approximately \$1.50—for the fiscal year.)

The better prices ruling during the year for copper and silver, together with the reduced smelting charges, the result of a contract entered into by the chairman on his visit to Rossland in the early part of last year, made it possible for the board to materially increase shipments and at the same time reduce mining costs, which latter show an expenditure of \$3.85 per dry ton of ore mined, as compared with \$4.22 and \$4.45 per ton for the two previous years.

An option has been acquired over the Vancouver group mine, a silver-lead property in the Slovan district, and the sum of \$15,754 has been expended upon it to date. The property had been previously worked upon a small scale for some time, and only a very high-grade silver-lead ore had been shipped when 708 tons yielded the considerable sum of \$65,826. Messrs. Hill and Stewart, the company's consulting engineers, anticipate being able to make sufficient profits from the shipment of ore and concentrates while developing the property, to cover all the expenses of the option.

The company has also acquired an interest in Queensland, Australia, where a large and, what seems to be, important copper field is being opened up. The company's interest consists in a considerable holding of shares in the Cloncurry syndicate, which in turn holds a large interest in the Queensland Exploration Company.

The directors again testify to the skilful management and services rendered to the company by their engineers, Messrs. Alex. Hill and Stewart, and to the excellent work done by the mine manager, P. S. Couldrey, and his staff at Rossland.

SKYLARK DEVELOPMENT COMPANY, LTD.

The adjourned annual meeting of shareholders in the Skylark Development Company, Ltd., which is working a small high-grade silver-gold mine situated in Greenwood mining division, Boundary district, was held about the middle of February at Phoenix. From the *Pioneer* it is learned that the reports of the secretary-treasurer and manager were read and adopted, the shareholders being well pleased with the results of operations for the year 1906. The following directors and officers were elected for the ensuing year: President, A. B. W. Hodges; vice-president, W. S. Macy; manager, O. B. Smith, Jr.; secretary-treasurer, A. B. Hood; C. D. Hunter, R. B. Boucher, F. C. Buckless, H. A. Wright and Page Doyles.

For the year ending December 31, 1906, the total receipts of the company were \$47,441.18, and the net profits on the operations at the Skylark mine, which has been continuously worked with a force of from 20 to 25 men, \$12,643. Of the latter amount, \$12,000 was paid on the bond, leaving a balance of \$3,000 due on the \$30,000 bond on April 1, which is already provided for by cars of ore now at the smelters for treatment. During the year the best car of ore gave returns of \$5,960.65. An average of all ore shipped, first, second and third class, was \$79 per ton, while the highest returns gave \$210 per ton net. During the year the company paid out for freight and

treatment, approximately, \$9,000; taxes were \$906.37, and \$750 was expended on new buildings. The old upright boiler was replaced by a locomotive boiler, and it is the intention, as soon as warranted, to install a 10-drill air compressor plant, so arranged that it can be driven by electricity, lines of both electric power companies passing close to the Skylark mine.

Manager Smith stated in his report that during the past 12 months 709 ft. of development work had been done in the Skylark mine, and 602 tons of ore shipped. The development consisted of 200 ft. of shaft work, 168 ft. of cross-cuts and 233 ft. of drifting and 108 ft. of raising. Beside this 620 ft. of diamond drilling was done, with results satisfactory to the management. Votes of thanks were passed by the shareholders to William Rowe, superintendent, and A. B. Hood, secretary-treasurer. The mine is located about two miles from Phoenix and the shares are almost all owned in Phoenix.

INTERNATIONAL COAL AND COKE CO.

The report of the directors, statement of liabilities and assets, and president's report, of the International Coal and Coke Company, Ltd., for the year 1906, have been published. From these the following particulars have been taken:

DIRECTORS' REPORT.

The directors present their third annual report, covering the year ending December 31, 1906, together with statement of assets and liabilities.

The net profits for the year, after paying all operating expenses and charges of every kind at the head office and mines, amount to \$108,102.15 (being over 7 per cent. on the outstanding capital), which sum has been derived from the various departments of the company's business, together with the sale of coal and coke, receipts on account of lots sold from the company's townsite, and returns from water and electric light supplied by the company to the people of Coleman.

As no dividend was paid on the capital stock of the company for the year, the above sum has been carried to credit of Profit and Loss, making a total at credit of that account of \$393,469.84.

In explanation of the "contingent liability" item, this amount is almost wholly made up of sight drafts long since paid. We do practically no discounting, sales being made on monthly account. As the plant is quite new, the policy has not been to add betterments and repairs to the cost of plant and write off depreciation, our idea being rather to keep the plant in the highest state of efficiency, consequently no depreciation should be written off.

With reference to the auditor's suggestion re townsite, this point is probably well taken, although the deferred payments on lots already sold will more than compensate for the cost of the land, as section 8, being townsite property, stands in our books at the original cost; the lots sold brought many times the price of an acre. It is the intention of the directors to adjust this account during the coming year.

The coal produced during the year was 334,230 tons, of which 49,635 tons were sent to the company's ovens and produced 31,066 tons of coke, which found a ready sale; the balance was marketed as coal.

In accordance with your instructions, the president arranged a bond issue of \$300,000 on the property, the same being pledged for \$200,000, and this amount—we are happy to report—is the only outstanding obligation of the company.

The total amount of the pay-roll for 1906 was \$360,874.72; average number of men employed, 365, and the number of days worked, 249.

During the year extensive additions were made to the plant (the expenditure having been \$85,112.04), which include an additional battery of coke ovens, additions to

the air haulage system, mine tracks and cars, powder, oil and lamp houses, scales, pumps, etc., etc.

Liabilities—	
Share capital, 200,000 shares of \$1 each	\$ 200,000 00
Debiture bonds: authorized issue \$300,000 pledged to secure local	100,000 00
Contingent liability on bills and drafts discounted	\$ 8,421 00
Surplus:	
As at December 31, 1905	\$ 108,192 15
Less amounts chargeable against operations of 1905	6,250 00
Add profits of 1906.	198,192 15

Assets—	
Shares in treasury, 200,000 shares at par	\$ 200,000 00
Coal lands	2,853,185 00
Real estate, buildings and stable equipment	16,510 85
Mine plant and machinery, including water-works and electric light equipment	413,197 82
Office furniture and fixtures	846 10
Coal, coke and stores on hand	34,379 80
Sundry debtors on open account	24,505 40
Interest and insurance paid in advance	6,940 30
Cash on hand and in bank	41,749 57

The auditors stated in their report: Expenditure on mine development has been charged against profits, which include proceeds of coal mined and the receipts from sales of the company's townsite lands, no credit being given to the property accounts in respect of these transactions and no provision being made for depreciation.

PRESIDENT'S REPORT.

Part of the president's report follows:

We were able to operate only 249 days in the year, the chief difficulty having been a shortage of shipping facilities. The Canadian Pacific Railway Company used every possible means to keep us supplied with cars, and move those cars when loaded, but unfortunately the general expansion of business has been so great that notwithstanding enormous additions to the rolling stock of that company, it has been quite impossible to keep abreast with the increased demands.

The increase in tonnage mined, over that of 1905, is 93 per cent., bringing about a reduction in the cost of mining per ton of 11 per cent., working only one shift of eight hours per day. The average daily tonnage during 1905 was 654 tons per day, while during 1906 the production was 1,337 tons. We have had most satisfactory results in mining of the pillars in the mine. The calculated saving of coal was about 60 per cent., but our experience has demonstrated 98 per cent. coal actually taken out of the pillars.

We have not added the development cost to the Capital Account, but have charged all such expenditures on the tons extracted. During the year the excess of development over shipments was approximately 400,000 tons. Our engineer gives an estimate of the coal developed, as at December 31, 1906, as being 1,600,283 tons. Were we to calculate even the small sum of five cents per ton, a very large addition would be made to Profit and Loss Account.

We began in 1906, with a new drift, 500 ft. long,

down some 860 ft. we began drifting north on the 500-ft. level to prove the coal, when we encountered a body of water, though every known precaution had been taken. Every day, until the water was pumped out, we were ever, more than compensated in the knowledge that the water was being pumped out, and of great depth. Our production was in no way interfered with because of this accident.

In the meantime, the 500-ft. seam was pitching at such a degree that if it were mined to some considerable depth, say 1,500 ft., it would be beyond our westerly line on section 5, and in order to insure continuity of operations at great depth, your directors deemed it wise and prudent to purchase the westerly half of this section, which was accordingly secured at a cost of \$10,000.

After the additions to the plant were provided for, and all obligations (other than the bonded indebtedness) had been taken care of your directors decided to declare a dividend of 1 per cent. out of the profits of the year just closed, payable February 1. Noting the total of quick assets, also of the surplus, you will, I think, agree that we shall be fully justified in the payment of similar dividends in May, August and November of this year, and with reasonable good fortune and no explosions or other unforeseen difficulties to contend with, the quarterly dividends can be materially increased, though the policy, as hitherto, will be to protect and gradually enhance the value of the property by the creation of a substantial surplus, having due regard to the shareholders' interests, by making reasonable returns on their investment.

All necessary steps have been taken to regularly list the International on the stock exchanges of Montreal and Toronto. When the new certificates to comply with the regulations shall be ready, the stock will be quoted daily.

The company's townsite, also the waterworks and electric light system at Coleman, are showing good profits, and as the works are enlarged will, I think, become an important source of a large and permanent revenue, even if kept at the present low figures.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi.—January. Shipments amount to 10,740 tons, containing 3,550 oz. gold, 5,100 oz. silver and 213,650 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, \$28,000. (Office note.—The Northport smelter has been closed down on account of want of fuel consequent upon the late strike at the coalfields. It is hoped shortly to reopen again. The mine is still working.)

receipts are \$10,500, being payment for 1,000 tons shipped. Vancouver mine report for last month—Shipped 20 tons. The net receipts are \$1,332 (£275), being payment for 20 tons shipped. (Office note.—No payments were received during the month for concentrates shipped from the Josie (Rossland) or Vancouver (Slocan) mines.)

Slough Creek.—The erection of all the new machinery is being vigorously pushed.

—Tyee ore, 1,553 tons; custom ore, 635 tons; total, 2,188 tons. Matte produced from same, 131 tons; gross value of contents (copper, silver and gold), after deducting costs of refining and purchase of custom ore, \$23,750.

west drift is in about 107 ft.; all quartz, which looks good. Face assays, \$10.20. Intermediate level above No. 3 east drift—Length, 52 ft.; assays \$3.65.

bullion, \$30,871. Saved 352 tons sulphurets; estimated realizable value, \$27,579. Working expenses, \$38,365. Returns cover month ending January 15. Short run caused by coal shortage.

Alaska Treadwell.—January: 240-stamp mill ran 24½ days; crushed 24,426 tons ore; estimated realizable value of bullion, \$35,352. Saved 488 tons sulphurets; estimated realizable value, \$25,552. Working expenses, \$74,228. Returns cover month ending January 15. Short run caused by coal shortage.

Alaska United.—January: Ready Bullion claim: 120-stamp mill ran 26½ days; crushed 18,230 tons ore; estimated realizable value of bullion, \$18,861. Saved 310 tons sulphurets; estimated realizable value, \$10,174. Working expenses, \$26,415. Returns cover month ending January 15. Short run caused by coal shortage.

DIVIDENDS.

At a meeting of the Le Roi No. 2, Ltd., held in London on February 4, a final dividend for the fiscal year ended September 30, 1906, was declared. Amount of this dividend was one shilling (25 cents) per share, and it brought the total per share for the fiscal year up to six shillings (£1.50) per share.

It is understood that the Granby Consolidated Mining, Smelting and Power Company, Ltd., intends shortly paying another dividend—its sixth.

NOTES.

The secretary of the Idaho Gold Mining and Smelting Company gives notice, in the *British Columbia Gazette*, that this company has ceased to do business in British Columbia and does not intend to resume.

A press despatch dated London, February 5, has been published, intimating that the proposition that the 120,000 £5 shares in the Le Roi No. 2, Ltd., should be divided into 600,000 shares of £1 each has been negated by a general meeting of shareholders.

The destruction by fire in February of the shaft house, hoisting plant, etc., at the Richard III mine, Mount Sicker, Vancouver Island, caused the owning company temporary inconvenience, but not much monetary loss, the property having been insured. Resumption of shipments of 40 to 50 tons of ore daily to the Tye Copper Company's smelter at Ladysmith will follow immediately after a new hoist shall be installed.

In his annual report the manager of the Skylark company operating the Skylark mine, near Phoenix, Boundary district, stated that: "Last year we considered our ore body in the north of the 75-ft. level to be so broken up that it was hardly worth while doing more work there. However, the diamond drill showed us our mistake, and now we are running the north drift again on that level in good ore."

According to an announcement made publicly in Spokane, the headquarters of the Sullivan Group Company, its position is steadily improving. It was stated that: "About \$15,000 more net gain and 100 tons less bullion produced was the record of the Sullivan Group Mining Company for the month of January. The principal reason for the decline in the bullion output was that the water pipes at the smelter froze, it having been 32 deg. below zero there for a time during the recent cold snap. Bruce Clendenning has resigned the management of the mine and Ed. Dedolphi, who has been metallurgist at the smelter for some time, is now general manager of all the company's property in East Kootenay. It is understood that the company is now in shape to begin buying in its bonds, issued some time ago. The foundations are all in for additional Heberlein roasting furnaces and the erection of this necessary adjunct to successful reduction of the ores will be decided by the trustees at their next meeting."

At a meeting of local shareholders in the Rosella Hydraulic Mining and Development Company, held at Nanaimo on February 22, a committee was appointed to

endeavour to sell more stock to shareholders and thereby raise funds for the ensuing season's operations. It was stated to the meeting that "rigid economy had been practised and the position of the company today had been accomplished by a total expenditure of but \$55,652.14 for which it has to show, as follows: Hydraulic leases, covering 4½ miles; two quartz claims on Haskins mountain; a modern hydraulic plant, together with a large quantity of pipe; a well-constructed flume, water ditch and reservoir; blacksmith shop, machine shop, tools, camps, etc.; and a large bank of gravel, through which the flume has to pass, cut to within 85 ft. of pay gravel, in the ancient channel of the stream.

CERTIFICATES OF INCORPORATION.

The Investors, Ltd., with a capital of \$50,000, divided into 1,000 shares of \$50 each.

Bertha Consolidated Gold Mining Company, Ltd., with a capital of \$375,000, divided into 1,500,000 shares of 25 cents each.

Natural Resources Purchasing and Developing Company, Ltd., with a capital of \$100,000, divided into 1,000 shares of \$100 each.

The North British Columbia Exploration Company, Ltd., with a capital of \$100,000, divided into 1,000 shares of \$100 each.

REGISTRATION OF EXTRA-PROVINCIAL COMPANY.

Kootenay Copper Mining Company, Ltd.—Head office at Spokane, Washington, U. S. A. Capital, \$50,000, divided into 1,000,000 shares of 5 cents each. Head office in British Columbia at Creston, West Kootenay. Attorney (not empowered to issue and transfer stock), O. J. Wiggins, farmer, Creston. Objects, mining in British Columbia, and in the States of Idaho and Washington, U. S. A.

COMPANIES REGISTERED IN ENGLAND.

B. C. M. Syndicate, Ltd.—Registered in London on February 7, with capital £6,200, in 6,000 ordinary shares of £1 each and 4,000 deferred shares of 1s. each, to search for, prospect, examine, and explore mines and ground supposed to contain minerals or precious stones, to acquire, hold, and deal with shares, stocks, debentures, debenture stock, bonds, obligations and securities issued or guaranteed by any company or undertaking carrying on business in the United Kingdom, British Columbia, Canada, or elsewhere. No initial public issue. The first directors are C. E. Daniel and F. E. Barnes. No qualification necessary. Registered office: 42 Old Broad Street, London, E.C. *Vancouver Copper Company, Ltd.*—Registered in London on February 27, by Francis & Johnson, 19 Great Winchester Street, E.C. Capital £110,000, in £1 shares. Objects: To adopt an agreement with the Vancouver Railway Syndicate, Ltd., to acquire copper, iron, gold, coal, and other mines, rights, and claims, and to carry on the business of miners, smelters and refiners of ore and dealers in ores and minerals, etc., in British Columbia, the United States of America, Great Britain, or elsewhere. Minimum cash subscription, 30,000 shares. The first directors (to number not less than three nor more than seven) are to be appointed by the signatories. Remuneration, £200 each per annum (£100 extra for the chairman) and 5 per cent. of the profits available for distribution in excess of 15 per cent. on the shares, divisible.

Geo. C. Tunstall, Jun., for some time general representative of the Hamilton Powder Company in the Kootenay district of British Columbia, is now sales manager for the Standard Explosives, Ltd., Montreal, Quebec.

COAL MINING NOTES.

The Nicola Valley Coal and Coke Company has commenced the shipment of coal from its property near Cootlee, in the Nicola district. An 18-ft. seam is being opened up and the coal taken out in the course of development shipped. The first carload shipped to the coast has been received in Vancouver, where its good quality became evident to those among whom it was distributed for sampling purposes.

Townsite agents are not usually modest in their statements. Those representing Hosmer, the new coal-mining town in the Crow's Nest Pass, assert, in an advertisement that: "Hosmer is the headquarters of the Canadian Pacific Railway Company's colliery operations in East Kootenay and the company is now spending millions in rapidly getting its mines on a producing basis. It requires thousands of tons daily to coal its own locomotives. The Crow's Nest Pass coal is the finest steam coal on the continent, and these mines are to be operated on a large scale. Coke ovens will be built this spring." All of which may be near enough to the truth to pass without being designated "hot air" only.

At Michel the Crow's Nest Pass coal Company is proceeding with dispatch to complete the new washhouse being built on the site of the one destroyed by fire last fall. The new building will be much larger and more commodious than the old one. By April 1 the building will probably be ready for use. The company will also erect 20 new cottages and a large up-to-date boarding house as soon as the necessary materials shall have been delivered.

The Diamond Vale Coal and Iron Mines, Ltd., expects to begin shipping coal from its property near Cootlee, Nicola district, about May next. The work of sinking a 10x10-ft. double compartment shaft to reach a 6-ft. seam of coal, is well in hand. Some 60 to 70 men are employed and the preliminary work of equipment and development is making good progress. Sinking is proceeding at the rate of between 75 and 100 ft. per month. Analyses of four representative samples from separate parts of the property show the coal to be of excellent quality.

A press despatch from San Francisco, California, dated February 10, gave the following information concerning the coal situation in that city: The steamer "Sheila" arrived at the Western Fuel Company's bunkers yesterday with 6,000 tons of Wellington Colliery Company's coal from Ladysmith. Unfortunately for San Francisco coal burners, about 40 per cent. of this cargo goes to fill government contracts, and will be distributed to the army posts in this vicinity and at Monterey. The remainder will be placed with city dealers, to the exclusion of orders from interior towns. No coal has been supplied to outside dealers for 30 days past, and many points are in great need. It is estimated that 1,000 cars will be necessary to supply these demands. * * * The steamer "Condor," which arrived from Nanaimo on 5th inst., distributed about 1,200 tons here, and the remainder of 3,000 tons is being unloaded at Oakland. The total of about 4,500 tons, which arrived last week for San Francisco's exclusive use will be augmented by the 3,300-ton cargo of the "Tellus" due on 11th inst. The most important early shipment expected is that of 5,000 tons in the hold of the steamer "Forerick," from Newcastle, Australia, due within a week.

The *Hardware and Metal Journal*, of Toronto, Ontario, says: Discussing coal mining and that industry generally, Thos. R. Stockett, recently, expressed the opinion that the hardships in the Northwest would result in good to the people themselves and to the coal mining companies. Mr. Stockett, who is now manager of the Western Fuel Company's mines at Nanaimo, Vancouver Island,

was formerly in charge of the Crow's Nest Pass Coal Company's mines in southeast Kootenay, so he is in a position to know conditions as they are. He points out that even now the mines of which he is manager are

it is almost a case of shut down because the demand is so light. This is even more emphatically the case with the mines of the Crow's Nest. Then when winter comes on, with the extremely doubtful conditions of transportation, everyone rushes in orders. If consumers, especially in the prairie provinces, where the winter needs are accurately known always, would fill up their coal cellars and coal sheds in the summer and fall months when railway transportation is good, and before the grain rush begins and had weather stops transportation, there would be no trouble. Speaking of conditions at Nanaimo, Mr. Stockett said that his company is now producing as much coal as the New Vancouver Coal Company, its predecessor in the Nanaimo mines, ever did in its palmest days. Three years ago Nanaimo was considered at its lowest ebb, but now there is solid prosperity and quiet progress, exciting not the least comment, though, as he said, the amount of coal being raised equalled that of the best boom days of the island coal city.

A CHEAP PROSPECTING DRILL.*

This machine has been designed by Mr. Stanley B. Hunter to deal with a class of basaltic deep lead country, which lies intermediate between the shallow alluvial auriferous deposits, overlain by by Cainozoic strata of clays, gravels, and drift, and the extremely deep ground (reaching a depth of 600 ft. in places) where the superincumbent material is composed of about 80 per cent of basalt. In the former class of country, to a depth of about 100 ft., manual power is efficient, and probably cheaper than any other class of boring, costing from 1s. to 2s. (25 to 50 cents) per ft., but directly a stratum of hard basalt is met with, say only 20 per cent of the total depth, the cost will run up to 10s. or 12s. (\$2.50 to \$3) per ft.; while to send a diamond or calyx drill, the total equipment of which for such work will weigh from 21 to 25 tons, would, through transport and erection of plant, bring the cost per foot to an unduly high amount. A machine, therefore, between these two extremes becoming necessary, led to the designing of the one in question, the principal features of which are as follows:

Easy and cheap transport, either by road or rail.

Rapid starting of plant at bore site, the unloading, erection of derrick, and commencement of boring from time of arrival on ground, being about four hours.

The derrick forms, when lowered down on to road wheels, the carriage, upon which all tools, rods, casing, and camp equipment is carried.

Ample room for men to work round the borehole, a very necessary requirement when casing is being worked down through the drift.

Rigidity of derrick when a great lifting strain is exerted on rods or casing.

The substitution of an oil engine for steam power. At the machine now in use at Trentham, a "Simplex" oil engine of special design, colonial manufacture, is being used, and is giving complete satisfaction.

The lessening of one man per shift, the staff comprising four men, who work in two shifts when boring in basalt or clay, the four men working on the one shift only when in drift, handling casing or shifting from bore to bore.

The machine is capable of boring a hole to 8 in. in diameter, and, if necessary, calyx cutters and hollow rods can be used to produce a core. The total equipment, including engine for boring in 250 ft. ground, is about 7 tons.

*From the "Annual Report of the Secretary for Mines and Water Supply for 1905." Victoria, Australia.

BOOKS, ETC., RECEIVED.

American Institute of Mining Engineers.—Bi-monthly Bulletin. No. 12, November, 1906, and No. 13, January, 1907. Also "List of Members, etc.," January 1, 1907.

California State Mining Bureau—

Bulletin No. 44, "California Mines and Minerals." Compiled by Chas. G. Yale, statistician State Mining Bureau. With relief and county maps and other illustrations.

Map of the Forest Reserves of California. Compiled by the State Mining Bureau.

"Report of the Board of Trustees and State Mineralogist." Lewis E. Aubury, state mineralogist.

Canadian Mining Institute—"Journal of the Canadian Mining Institute for 1906," Vol. IX, containing Proceedings, Papers, etc. Edited by the secretary, H. Mortimer Lamb. Also "List of Officers, Members and Student Members as at June 1, 1906."

Columbia University, New York City, U. S. A.—*School of Mines Quarterly*. Vol. XXVIII, No. 2, January, 1907.

Department of Agriculture, Ottawa—"The Canada Year Book, 1905," second series. Containing events of the year, census and departmental statistics, etc. By A. Blue, chief officer Census and Statistics Office. Pages, 341.

First Indian Industrial Conference.—"Mining, Metallurgy, Mineral and Metal Works." A 44-page pamphlet by Rao Bahadur G. V. Joshi, B. A., head master Government High School, Satara, Bombay Presidency, India. (Per favour of Nanabhai B. Daru, B. A., B. Sc., Geological Survey Office, Ottawa.)

Illinois State Geological Survey—Bulletin No. 3, "Composition and Character of Illinois Coals." By Professor S. W. Parr, of the University of Illinois. With chapters on "Distribution of the Coal Beds of the State," by A. Bement, and "Tests of Illinois Coals Under Steam," by L. P. Breckenridge. Pages, 83. With maps.

Imperial Institute, London, England—Bulletin of the Imperial Institute. Vol. IV. No. 4.

Labour Department of Canada. *Report of the Department of Labour for the year ended June 30, 1906.*

Royal Colonial Institute, London, England—*Journal of the Royal Colonial Institute*, Vol. XXXVIII. Part I, December, 1906; Part II, January, 1907; Part III, February, 1907.

Sundry Geological Problems, by G. Henriksen, inspector of mines, Christiania, Norway, being a statement of the author's conclusions from the geological observations he has been able to make in Norway.

United States Geological Survey—

"Bibliography and Index of North American Geology, Paleontology, Petrology, and Mineralogy for the Years 1901-5, inclusive." By Fred Boughton Weeks. Pages, 770.

"Geology of the Bighorn Mountains, Wyoming." By N. H. Darton. Pages, 121. With maps and numerous half-tone illustrations.

"Ore Deposits of the Silver Peak Quadrangle, Nevada." By Josiah Edward Spurr. Pages, 168. Illustrated by maps, sectional drawings, views of prominent features of country, representations of rocks and sections of specimens, etc.

BOOKS REVIEWED.

Rock Minerals, their Chemical and Physical Characters and their Determination in Thin Sections. A study of rocks and their mineral components together with descriptions of the better known rock minerals. By Joseph P. Iddings, Chicago, Illinois, U. S. A. Octavo, xii, 548 pages, 438 figures and one coloured plate. Published at close of 1906 by John Wiley & Sons, scientific publishers, New York. Cloth, \$5, postpaid.

Part I of this book treats of general principles and methods of research, which are subdivided into three chapters—(I) chemical principles and characters, (II) physical principles and characters in part, and (III) optical properties. Part II of the work gives detailed descriptions, concluding with tables of the optical characteristics of the rock minerals.

Dr. R. W. Raymond, secretary of the American Institute of Mining Engineers, lately published the following comment on this book: Professor Iddings is a recognized authority in the modern science of petrology, which has so greatly enlarged, and at the same time focalized and defined, the work of geologists. Neither the nature nor the history of a rock can be decided nowadays without recourse to the refined methods and trained judgment of the petrologist, to whom the field-observer habitually sends his specimens for examination and classification. This book supplies the pressing and general need of a clear, comprehensive and trustworthy manual of the new science. It treats of the general principles and methods of research, including the chemical and physical characters and laws involved, and gives (in Part II) a descriptive catalogue of the rock-making minerals, followed by tables showing their optical characteristics, and a large "folder," presenting a coloured plate which exhibits their interference-colours and "birefringences." In short, the book is calculated to show the student how to observe thin sections of rocks, and how to interpret his observations—in both of which particulars there is danger of careless work and need of sane guidance.

Notes on Metallurgical Mill Construction. Edited by W. R. Ingalls, editor of the *Engineering and Mining Journal*, New York. Pages, 251. Octavo cloth. Price \$2, postpaid.

This book is a reprint of a series of articles, bearing upon some of the important details that enter into the construction of metallurgical plants, especially mills of various kinds. These articles have appeared in the *Engineering and Mining Journal*, chiefly in recent years. They relate to a variety of subjects of great importance in the design, construction, and operation of metallurgical mills, and are by eminent experts in the mining profession. The thorough and careful revision to which they have been subjected by the editor, Mr. Ingalls, has added to their general accuracy and reliability. The data they contain is now presented in a convenient and readily available form. The information given is comprehensive and includes much detail connected with the construction of concentration mills, cyanide plants, and smelting works. The volume is illustrated and the numerous diagrams add greatly to its practical value to mill and smelter men.

THE NO. 5 WILFLEY CONCENTRATOR.

Mussens Limited advertise, on page XI of this issue, the No. 5 Wilfley Concentrator, for which they are sole Canadian agents. A circular they have had prepared gives full particulars of the special advantages possessed by this concentrating table, together with the great improvements effected in it, which, it is claimed, still keep it far ahead of all competing machines in the market world over. Full and complete details of these tables will be found in Bulletins No. 21 and 22, which will be supplied free on application. The above-mentioned circular calls particular attention to a number of points well worthy of the consideration of all requiring concentrators, and says further that there is simply no comparison at all between the No. 5 Wilfley table this firm is offering and other tables made along imitative lines but the chief claim to merit of which latter is based on lightness of construction or a low selling price.—Advt.

W. H. Storms, for years prior to January 1, 1906, editor of the *Mining and Scientific Press* of San Francisco, California, has re-entered the field of mining journalism as managing editor of the *Mining Review* of Los Angeles in the same state.

TRADE NOTES AND CATALOGUES.

Montreal, Canada, recently issued a new catalogue, drawing attention to the fact that they are the sole Canadian agents for Fraser & Chalmers, Ltd., whose only works are at Erith, Kent, England, and who are stated to have the best equipped shops in the world for manufacturing the highest quality and latest designs of all classes of mining and metallurgical machinery. Enquiries are particularly solicited for crushing, milling, concentrating, and smelting equipment, as well as large winding engines, compressors, or any plant requiring special care in design or building.

The Jeffrey Manufacturing Company of Columbus, Ohio, U. S. A., has sent out Bulletins B and C illustrating the "Grab Bucket System" and "Coal and Ashes Handling Machinery for Power Houses." These show many ways in which grab buckets, conveyors, etc., handle coal, ashes, and other materials.

The Yukon Consolidated Goldfields Company, Ltd., has purchased a considerable quantity of electrical apparatus from the Canadian Westinghouse Company, which it will use in connection with gold-dredging work.

"Storage Batteries for Stationary Service" is the title of the Westinghouse Machine Company's "Catalogue S" which describes and illustrates "Type S" storage batteries of Westinghouse manufacture. In addition to descriptive notes there are a number of tables of technical details giving exhaustive information relative to the various apparatus illustrated.

The Chicago Pneumatic Tool Company has published a 116-page catalogue (No. 20) dealing fully with Franklin air compressors which it manufactures.

Power and Mining Machinery Company's catalogue No. 7, "Cement-Making Machinery," is a handsomely-printed and illustrated publication descriptive of machinery for the production of portland cement by either the wet or dry process.

"Hawthorne Works" is an illustrated booklet describing the Western Electric Company's new 110-acre plant at Hawthorne, Illinois, U. S. A.

Section No. 7 of the Canadian General Electric Company's Supply Catalogue has been received. It is devoted to wires and cables, and in addition to illustrations and descriptions of the materials, contains numerous useful tables.

The Wellman-Seaver-Morgan Company's pamphlet, "What We Do in Mining and Power Machinery," outlines in a general way the power and machinery department of its business, while accompanying illustrations show some of the more important pieces of equipment the company is prepared to supply.

The C. H. Shaw Pneumatic Tool Company's "Catalogue D" deals with rock drills and complementary articles it manufactures.

Particulars of its steel sheet piling are given in a booklet published by the United States Steel Piling Company, and reprints from trade journals supplement this information.

Mr. W. A. Duff, assistant manager of the Montreal office of the Canadian Westinghouse Company, has been promoted to the Western managership of that company, with headquarters at Winnipeg, Manitoba. Mr. Duff has been identified with the Westinghouse interests for some years, and his promotion is well deserved. He is a graduate in electrical engineering of McGill University, and well known in the electrical engineering field.

Arthur A. Cole, who prior to being appointed mining engineer to the Temiskaming and Northern Ontario railway commission was first chief assayer and afterwards mining engineer at the Centre Star and War Eagle mines, Rossland, is now located at Cobalt, looking after the interests of the commission in some valuable silver-cobalt mines in that district.

H. Mortimer Lamb, secretary of the Canadian Mining Institute expects to visit British Columbia in April.

M. S. Davys of Nelson recently spent a week or two in Victoria.

J. M. Turnbull of Trail, one of the Consolidated Mining and Smelting Company of Canada's mining engineers, has returned from a business visit to Mexico.

Edward Dedolph, manager of the Sullivan smelter at Marysville, East Kootenay, has returned from a business visit to Spokane, Washington, U. S. A.

W. Mitchell is now superintendent at the Second Relief gold mine at Eric, Nelson mining division, in succession to W. B. Hudson.

R. W. Brigstocke, who last year left Nelson for Cobalt, New Ontario, is now superintendent of the Drummond mine in that widely-known silver camp.

F. H. Oliver of Spokane who managed the Morrison mine, Boundary district, when it was being developed, is now at Toronto, Ontario.

W. E. Segsworth, for several years resident at Greenwood, Boundary district, recently went to Cobalt, New Ontario, to there look after some mining interests.

J. Cleveland Haas, E. M., of Spokane, Washington, has lately been examining silver properties at Cobalt, New Ontario, in the interests of United States clients.

W. N. Bisset, hydraulic superintendent for the Cariboo Gold Mines, Ltd., has returned to Bullion, Quesnel Forks, after having spent the winter in California.

Paul Johnson spent a day in Victoria late in February, having come over from Seattle in company with D. B. Brown, president of the Alaska Smelting and Refining Company.

W. C. Dalglish, well known in the Slovan district in which he was a mine manager, is now located at Paterston, N. J., U. S. A., where he represents the Tiffany-Cobalt Mines, Ltd.

The Los Angeles Mining Review states that Herman Bellinger, metallurgist of the Greenwater & Death Valley Mining and Smelting Company, has arrived at Greenwood, California, from the East.

J. O. Gillice has resigned the position of representative of the Allis-Chalmers-Bullock Company for the Kootenay district, with headquarters at Nelson. He intends making California his next field of operations.

Robert R. Hedley of Nelson lately visited Fernie, south-east Kootenay, where he was the guest of G. G. S. Lindsey, general manager of the Crow's Nest Pass Coal Company, Ltd.

W. E. Zwicky of Kaslo recently visited the Sullivan lead-silver mine, East Kootenay. He was accompanied from Cranbrook by James Finlay, formerly superintendent of this mine.

Frederic Keffer of Greenwood, Boundary district, arranged to attend the ninth annual meeting of the Canadian Mining Institute, leaving S. C. Holman, late superintendent, in charge of the British Copper Company's several mines during his temporary absence.

Erland G. Hadow, some time ago in charge of the office of the Silver Cup Mines, Ltd., at Ferguson, Lardeau, is now at the Napoleon mine, Broyds, Washington, which mine is being operated by the British Columbia Copper Company.

R. H. Anderson has resigned as superintendent of the Sullivan Group Company's mine, situated on Mark Creek, near Kimberly, East Kootenay. He is stated to have obtained a better position with a mining company operating in the Coeur d'Alene country, Idaho, U. S. A.

W. Yolen Williams, of Spokane, Washington, formerly manager of the Granby Company's mines at Phoenix,

was a recent visitor to the field of his active operations during the years he was engaged in opening up the big mines of the company named.

Horace G. Nichols has arrived from England and taken charge at the Ymir mine. He is reported to have stated, when interviewed at Nelson, that ample funds are now available for the further development of the mine, at which operations were to be resumed early in March.

The Nelson *Canadian* has stated that E. M. Hand, late manager of the Ymir mine, was at that time undecided whether to remain in British Columbia or proceed to Mexico. In both countries mentioned positions had been offered to him.

The Nelson *Daily News* states that Al. Huston, who is in charge of development work at the Broadview mine, Ferguson camp, Lardeau, has 20 men engaged in opening up that property, and that it is intended to employ about double that number in the spring.

L. F. Warner, engineer in charge of the work of enlarging the water supply system of the Cariboo Mining Company in the Quesnel Forks country, is preparing for a resumption of operations with the opening of the ensuing season.

J. E. McAllister of Greenwood, manager for the British Columbia Copper Company, is expected to shortly return from Europe whence he went in the hope that the change of climate and scene, together with expert medical treatment, would result in his complete restoration to health.

R. Gilman Brown of San Francisco, California, has announced his intention to remove to London, England. Mr. Brown has been an occasional visitor to British Columbia in the capacity of consulting engineer to the Ymir Gold Mines, Ltd., operating at Ymir, Nelson mining division.

A. G. Low, director and deputy head of the Geological Survey of Canada, is dangerously ill at his home in Ottawa, Ontario. While his recovery is regarded as probable it is expected that should it happily ensue, it will be several months before he will be able to resume his official duties.

W. H. Aldridge of Trail, managing director of the Consolidated Mining and Smelting Company of Canada, late in February visited the Canadian Metal Company's Blue Bell mine on Kootenay Lake in company with J. E. Harrington, secretary, and S. S. Fowler, manager of the latter company.

W. J. Elmendorf, M. E., of Spokane, Washington, was in Nelson during February. Beside acting in the capacity of consulting engineer to the Reliance Gold Mining Company, Mr. Elmendorf's professional work in British Columbia has included that of examination of the mine workings over which the dispute arose that involved the long-continued litigation in the Star vs. Byron N. White case.

The *Hedley Gazette* states that A. Aeberli, hydraulic engineer, and E. N. Breed, electrical engineer, have been looking into the additional power and equipment requirements of the Daly Reduction Company's stamp mill at Hedley. It is understood these gentlemen will advise what changes and additions are needed to give the mill the larger capacity requisite for the projected increase in its treatment capacity.

E. A. Holbrook, superintendent of the Daly Reduction Company's stamp mill and cyanide plant, has returned to Hedley, Similkameen, from his home at Fitchburg, Massachusetts, U. S. A., where he had been summoned on account of the serious illness of his wife which, unfortunately, resulted in the death of that lady on February 16.

The *Ashcroft Journal* states that D. P. Cameron, vice-president of the Western Engineering and Construction Company, has been up to Big Bar, on the Fraser River,

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in connection with the proposed development of the district, is enthusiastic as to the prospects of the district, is enthusiastic as to the prospects of the district.

W. H. Barnes, lately made superintendent of the Queen Charlotte group of islands, northern British Columbia. The production of copper ore in the locality visited has been commenced by a Japanese company which is opening up a claim that gives promise of developing into a valuable mine.

Robert B. Lamb, formerly general manager for the Daly Reduction Company at Hedley, Similkameen, B. C., has been appointed consulting engineer of the Barnes King Mining Company, operating at Kendall, Montana, U. S. A.

Byron N. White of Spokane, Washington, was in Victoria about the middle of February, remaining several days. He expressed himself as being pleased with the promise his Whitehorse copper properties are giving under development, and expects profitable returns from the ore—about 1,000 tons—he is shipping to the several coast smelters to ascertain values in bulk.

The professional card of Edward A. Haggen, mining engineer, of Revelstoke, appears on another page. Mr. Haggen is a member of the Canadian Mining Institute and the American Institute of Mining Engineers, respectively, and is well known in North Kootenay, particularly in the Golden and Revelstoke districts.

Thos. Kiddie, who succeeds Paul Johnson as manager of the Alaska Smelting and Refining Company's smelter at Hadley, Prince of Wales Island, southeast Alaska, goes north early in March to assume charge of the works and to ascertain what changes will be necessary in connection with the installation there of the Kiddie Hot Blast System, described in the MINING RECORD of October last (pp. 387-391). It is expected that a sufficient

Every day, declared Mr. DeWitt, can be seen from right to

ington mills.

The Mother Lode mine is preparing for an immediate shipment and already has some 200 sacks of ore down at the siding. The Nugget sent down on January to a carload of ore stated to be one of the richest sent out of Salmo for years. The Kootenay Belle is working a force of ten or more men and is getting out good ore.

The Queen gold mine and stamp-mill are running regularly. The concentrates are proving to be better than any heretofore made by the mill and the management is pleased at the additional saving thus effected.

The Emerald is averaging three cars a week and could do more; probably it will ship in larger quantity later in the year. The ore is dry lead carbonate.

The company lately organized by Mrs. Collins to work some properties on Lost Creek has succeeded in getting out one car which has been shipped to the smelter.

The Summit which is contiguous to the Ore Hill, has got out some very rich ore lately and sent one car to the Hall Mines smelter.

The Ore Hill is not doing much at the present, but will it is expected, be working a full force of men by the spring.



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HERBERT B. BROWN,
Hedley, Similkameen, B. C.



SYNOPSIS OF CANADIAN HOMESTEAD REGULATIONS.

Any available Dominion Lands within the Railway Belt in British Columbia, may be homesteaded by any person who is the sole head of a family, or any male over 18 years of age, to the extent of one-quarter section of 160 acres, more or less.

Entry must be made personally at the local land office for the district in which the land is situate.

The homesteader is required to perform the conditions connected therewith under one of the following plans:

(1) At least six months' residence upon and cultivation of the land in each year for three years.

(2) If the father (or mother, if the father is deceased), of the homesteader resides upon a farm in the vicinity of the land entered for, the requirements as to residence may be satisfied by such person residing with the father or mother.

(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

Six months' notice in writing should be given to the Commissioner of Dominion Lands at Ottawa of intention to apply for patent.

'Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2000 lbs. shall be collected on the gross output.

W. W. COBY, Deputy of the Minister of the Interior.
N.B.—Unauthorized publication of this advertisement will not be paid for.

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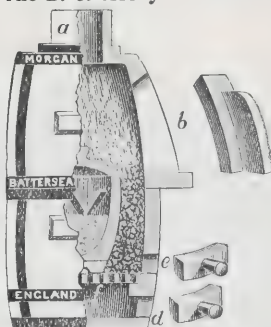
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Managing Editor

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NOTES AND COMMENTS.

The *Stewart Mining Record* publishes that no more ore will be shipped from the Stewart in 1907 than in any other year since 1900.

Nelson will have three big mines in its vicinity, operating with large forces this season, viz., the Ymir, La Plante and Queen Victoria, says the *Canadian*.

The Ashcroft *Journal* states that the Willow River Mining Company resumed underground work about the middle of March, under the management of F. C. Laird.

The fall of snow during the winter of 1906-7 has been generally plentiful enough to warrant the expectation of an abundant supply of water for next season's placer mining operations.

The Enderby *Progress* states that the members of the Enderby Coal Mines, Ltd., "have no doubt but what they have as valuable a coal property as there is in the Province." *Cum grano salis*.

Everything in local mining circles, reports the Whitehorse *Star*, Southern Yukon, indicates that the present will be the most prosperous year in local history. Money is freely coming in and on every hand are evidences of activity.

The winter now closing has been the most severe one the railway, mining and smelting companies operating in the Kootenay have yet experienced. The chief difficulties seem to have been overcome and conditions should soon be normal once again.

The Cariboo mine in Camp McKinney will be unwatered to the 400-ft. level by the end of the month and the mine cleaned to that depth, remarks the Greenwood *Ledger*. It will take some time to put the shaft in shape, but it is expected the stamps will be working in the summer of '07.

The Phoenix *Pioneer* wonders whether "the Granby, Brooklyn, Idaho, Snowshoe, Rawhide and other mines in Phoenix camp will be worked three thousand years, like the Rio Tinto in Spain?" Our response is that they will be worked for a long time for fear he should lose his reputation as a prophet.

From the Kamloops *Standard* it is learned that the old Dominion group of mineral claims, which lies on Coal Hill east of the Iron Mask, has been bonded to Glasgow parties, who have also taken an option on the Python group.

The *Slocan Mining Review* of Sandon thinks "the Slocan district offers unrivalled inducement for capital at this moment, and as there are numerous properties with large bodies of pay ore in sight, dwellers in the Slocan confidently anticipate a big rush the forthcoming spring." May their expectations be abundantly realized.

The Canadian commercial agent in South Africa (C. M. Kittson) reports that asbestos in payable quantity and of excellent quality has been discovered in the Transvaal. An expert who has examined the deposit states that it is of abnormal width and equal to the finest in Canada or Italy. An offer of £40 per ton has been received from Germany for the best quality.

What is popularly known as the Eight-hour Smelter Bill, has been passed by the Provincial Legislature. In two previous sessions a similar bill had been defeated, but on the premier this year announcing his intention to support it, the passage of the measure was assured. The text of the new act is printed on another page of this number of the *MINING RECORD*.

As the British Columbia Bureau of Mines has exhausted its supply of copies of the "Annual Report of the Minister of Mines" for the year 1900, the provincial mineralogist is desirous that anyone having a spare copy will be good enough to forward it to him. As soon as the "Annual Report" for 1906 (now being printed) shall be issued he will be glad to send a cloth-bound copy of that volume in exchange for every paper-covered copy of the 1900 report he shall receive.

In a review supplied to the *Revelstoke Mail-Herald*, E. A. Haggen, mining engineer, who is well informed on mining matters in the northern Lardeau, said: There is likely to be some activity in Eva and Imperial stock. The Eva mine at Camborne has been steadily making profits, a compressor plant has been installed and the excellent management of the property has instilled in the minds of investors increasing confidence in the property. All that is now wanted to place the property on a steady dividend paying basis is a larger mill, and this will undoubtedly be undertaken at an early date.

In the Provincial Legislature, Mr. J. A. MacDonald asked the premier the following question: "Is it the intention of the Government to introduce legislation at the present session of the House providing for the granting to the City of Rossland of a portion of the mineral tax collected, or which may hereafter

be collected, from the mines within the corporate limits of the City of Rossland?" The Hon. Premier McBride replied as follows: "This Government does not admit that the City of Rossland is legally entitled to any proportion of the mineral tax collected from the mines within its corporate limits; but the question of paying a sum by way of a grant to the municipality, as a matter of equity, on account of the peculiar physical conditions of the municipality in its relation to the situation of the mines in that district, is under consideration." The Government afterwards placed the sum of \$2,500 on the estimates as a grant on this account.

The Le Roi Mining Company has taken a long-time option on the properties of the Spitzee Mines, Ltd. The mineral claims are the Spitzee, Fool Hen, Darby and Nelson No. 2, having an area of 110 acres in all. The Rossland *Miner* reports Mr. A. J. McMillan, managing director of the Le Roi Mining Company, as having said lately in regard to the deal: "It is quite true the Le Roi Company has taken an option on the Spitzee group of properties. The negotiations have been in progress for several months but were only concluded today. The Spitzee has shipped a few thousand tons of ore containing good values, but like many others, the company owning the Spitzee group has been hampered for want of funds and has only worked its mine at intervals. As the Spitzee is situated some little distance from the other working mines in Rossland, its success would mean much, not only for those immediately interested, but for the community as a whole. If there is a mine in the Spitzee, we hope to ascertain that fact within a few months, for it is our intention to put men on at once and proceed with development." Mr. McMillan further stated that he was not at liberty to mention the terms of the option further than that the Le Roi Mining Company had a working bond covering a long period.

The increasing importance of the copper mining industry in British Columbia is made manifest in the article on this subject appearing in this number of the *MINING RECORD*. A total production to date of 243,400,000 lb. is, for a country like British Columbia, which did not begin producing copper on a comparatively large scale until 1901, makes a creditable showing. The development of the industry has been much greater during recent years than earlier, as the following figures will show. The total value of copper produced during all years to date was \$34,535,000. Of this amount all but \$255,000 was the product of the ten years reviewed in the article above alluded to. The total value of the production for five years, 1897-1901, was \$8,554,000, and for five years, 1902-1906, it was \$25,726,000. Another striking comparison is that of the average yearly production of the last-mentioned five years—\$5,145,200—with that of last year—\$7,277,500. It is especially satisfactory to know that this substantial advance was not the result of higher prices only; the

increase in quantity produced in 1906 over that in 1905 was about one-third of one per cent. Still more gratifying is the showing of a larger increase in quantity in 1907 as compared with 1906, conditionally that there occur no serious interruptions to the production of surface and underground.

Registration as an extra-provincial company of the British Columbia Amalgamated Coal Company, with head office at Portland, Oregon, U. S. A., and capital \$10,000,000, has been effected. The head office of the company in British Columbia is at Victoria. It will probably be remembered that in its number for October, 1906, the *MINING RECORD* turned its readers against a "company" similarly designated and which, under the name of "Orrin J. B. Vander, Banker and Broker, 61 Confederation Life Building, Toronto," published an advertisement containing what had the appearance of such gross exaggerations as to call forth a warning against the scheme from both Dominion and Provincial officials. We have no definite information that it is the same as the "Toronto Wildcat," as we called it when denouncing the ingenious misrepresentations of the individual above-named, but the fact that the Portland concern has a nominal capital of \$10,000,000 is of itself sufficient to cause enquiry as to its *bona fides*. No other coal mining company operating in western Canada has found it necessary to capitalize at half that enormous figure, not even the one having the largest collieries and production in the West. The one redeeming feature about the recently registered B. C. Amalgamated Coal Company appears to us to be that it has succeeded in getting as its attorney in the Province a barrister of such good repute and high professional standing as to make it quite certain he will not retain his connection with it in such capacity should it transpire that it is one of a class to be left severely alone. So far as the company itself is concerned we would suggest that if it be identical with the one responsible for the attempted deception of the Toronto man we exposed a few months since, and renews its efforts to sell stock, it should be given a wide berth by those who do not wish to lose their money.

The first number of the *Canadian Mining Journal*, a new mining journal published in Toronto, Ontario, has been received. The *MINING RECORD* extends to it a cordial welcome and sincerely hopes that the expressed intentions of its publishers to make it national in range and to assist in the upbuilding of mining, which they aptly designate "a great Canadian industry," may be successfully carried out. The new journal, with which has been incorporated the *Canadian Mining Review*, has been promised the hearty sympathy and active support as contributors of, among others, a number of men prominently associated with the mining industry of Canada. Its initial number is of such general excellence as to augur well for the attainment to the intended high standard it is aimed to maintain. With a single

exception the first number we have read has been published in its first journal. The exception is in the case of the *Canadian Mining Journal* and by a person long known as seemingly being unable in his connection with the mining industry of this Province to distinguish between the business of publication and the personal profit. He asserts that the owners of the new journal have purchased the old one "for the purpose of boosting Cobalt and any other mining district in which they may acquire large interests." Such a perverted view is a natural result of a certain habitude. In contrast to this gratuitous aspersion we quote from the *Canadian Mining Journal* its assurance that "it has no special interests to serve, no prejudices to obstruct its usefulness, and is untrammelled by considerations of financial disability in providing the necessary machinery by which to accomplish its purpose." The new journal will find its efforts along the lines indicated generally appreciated in British Columbia, long and deservedly known as "the mineral Province of Canada."

When in Los Angeles, California, recently, Mr. Samuel Newhouse, who is also largely interested in the Dominion Copper Company, operating mines and a smelter in the Boundary district of British Columbia, was interviewed by a representative of the *Mining Review*, which journal reports him as having said for publication concerning the property of the Nipissing Mining Company: "I have accepted the presidency of the company without pay and believe its property can be made a mine. I have worked out a scheme of development which will be comprehensive, and shall send several of my best men there. Though I cannot yet speak with certainty, the chances are excellent that the Nipissing will become a big producer. If that can be brought about the whole mining situation in this country will be greatly benefited." One of the "best men" sent to the Nipissing is Mr. T. R. Drummond who has been general manager of the Dominion Copper Company all through its progressive career since Mr. Newhouse became identified with it. Mr. Drummond has already gone to Cobalt, northern Ontario, where are situated the Nipissing Company's mining holdings, officially reported as being "the most extensive of any company in the camp, aggregating in all 846 acres." In the latest published report of the Ontario Bureau of Mines occurs the following concerning the Nipissing: "Only a small fraction of this area (846 acres) has been thoroughly prospected. The mines on this property have had the largest total production of any in Cobalt camp. From 25 to 30 veins have already been found, and of this number 11 were being worked at the time of inspection. A large tonnage of very high-grade ore has been taken from the most extensively developed vein—the Little Silver—the workings in which have reached a depth of 106 ft." The inspection mentioned took place some time since, the report being for the year 1905, since when developments on the Nipissing property have proved it to be wonderfully rich.

AN EIGHT-HOUR DAY IN SMELTERS.

EIGHT HOURS is to be the legal limit of time for men employed in or about smelters in certain specified kinds of work. The recent enactment by the Provincial Legislature of "An Act Regulating Hours of Labour in Certain Industries" does no more, though, than make eight hours a statutory day's work in lieu of one of the same length of time already conceded as a matter of custom in most smelters operating in the Province. The provisions of the new enactment follow:

1. This act may be cited as the "Labour Regulation Act, 1907."

2. No person shall be employed in or about any smelter, sorting, handling, removing or smelting ores or matte in any stage of preparation, for a longer period than eight hours in any 24 hours.

3. Any owner, agent, or manager, or anyone acting on their behalf, employing any workman or person in contravention of this act, shall be liable to a penalty not exceeding \$100 nor less than \$20 for each workman or person so employed, and any workman or person so working for a longer period than specified in section 2 of this act shall be liable to a penalty not exceeding \$100 nor less than \$20.

4. Twenty-four hours, for the purpose of this act, shall mean from midnight to midnight.

5. This act shall come into force on the first day of March, 1908.

STREAM-FLOW IN ALASKA.

THE STREAM-FLOW measurements that the United States Geological Survey has been making for a decade or more on important streams in various parts of the United States were, during the summer of 1906, extended to Alaska, in order that information might be obtained regarding the amount of water available for the economical development of placer mines and possible water powers in that Territory. The results of the work have just been published as No. 196 of the series of "Water-Supply and Irrigation Papers." That such information is essential to the profitable working of placer deposits is not always fully realized, and the lack of it has often been responsible for the financial failure of enterprises that promised success.

Limited funds and time necessarily restricted the investigations to a comparatively small area, and the Nome region of Seward Peninsula was selected because of its extensive mining interests. Stream-flow data were collected at 45 stations, and a careful study was made of the conditions affecting the water supply. It is believed that the data obtained, while far from exhaustive, give a fair idea of the conditions of flow that may be expected in the vicinity of the gauging stations, and that they will prove valuable in estimating stream-flow in other parts of the region.

As a result of the great value of the waters for use in the auriferous gravels, water-power possibilities on the peninsula have been neglected; but the de-

velopment of a large number of excellent power sites is feasible both from an engineering and a financial standpoint, and the attention of mining men is directed to such development. The report summarizes the hydraulic development of the region, and contains a much-needed warning against construction and installation of expensive machinery without the necessary preliminary investigation and engineering advice.

The report may be obtained free of charge by applying to the director of the United States Geological Survey, Washington, D. C.

DOMINION GOVERNMENT COAL REGULATIONS IN THE WEST.

COAL LANDS in the West, under the jurisdiction of the Dominion Government, are to be leased in the future. Under the caption "Better Late than Never," the *Canadian Manufacturer* has published the following comment:

An important change has been made by the Government in the regulations governing the acquirement of coal-bearing lands in the West still under Government control, with a view to preventing any further alienation of western coal areas to absolute control of private parties, and also with a view to securing the prompt development of all further areas opened to private enterprise, instead of having them held merely for speculative purposes by the purchasers. Hereafter, according to an order-in-council, the Government will only lease rights to mine coal on all lands still comprising Crown domain in the West. Under the previous arrangement the lands acquired by the Canadian Pacific Railway, the Hudson's Bay Company, the school lands, etc., were given without any proviso as to the Government's right to any coal found on them. Later the law was changed so as to allow the purchasers to buy the surface rights at \$3 per acre, and the coal rights at \$7 per acre, making a total of \$10 per acre for absolute control of all the lands in the coal-bearing areas. A royalty of 10 cents per ton on all the coal mined was also required by the Government. Under these regulations, which have now been cancelled, many millions of acres of land have passed out of the control of the Government, and there has been complaint in the West because the coal-bearing areas are not being developed, but are being held for speculative purposes to the detriment of the settlers. It is believed, however, that as much coal-bearing land remains still under Government control in Alberta, Saskatchewan and in the Peace River district as has been already alienated. It is proposed that hereafter a 21-year lease be granted to private individuals wishing to get control of coal-bearing lands, and that an annual rental be charged therefor by the Government. This rental will probably be one dollar per acre, and the lease will have to be taken out for a minimum area. This area will, it is said, be about 2,500 acres, so that the annual rental cannot be less than \$2,500. This will,

it is hoped, insure prompt development, and, more to the objection as to speculative hoarding and lands to be raised in price without doing anything to develop them. It will also pay the way for future Government ownership and operation of coal mines. It should be deemed advisable.

A LABOUR DIFFICULTY AT TEXADA ISLAND MINE.

HIGHER PAY has been demanded by miners employed at the Marble Bay mine, Texada Island. Since the demand has not been acceded to, the men have ceased work and the mine has been closed down. The Vancouver News Telegraph has published the following account of this matter:

The miners at the Marble Bay mine on Texada Island have gone out on strike, and all work has been suspended for the present. The Western Federation of Miners has called the men out because the management refused to agree to the demands of the union, which the company does not deem fair nor just, considering the favourable conditions under which mining is carried on at the Marble Bay mine, and, in consequence, they claim that the men have no cause for the action and stand taken by them.

Mr. A. Grant, manager of the mine, states that the beginning of the trouble came shortly after the notice of the demand of the union for increased wages was received, which was as follows: That machine helpers be abolished; that men engaged in stope work, drill work and hammer work should be paid \$3.50 per day of eight hours; that shaft-sinking work should be paid \$4 per day; that all men working in the timber crew should be paid \$3.50 per day, and the scale of wages was to go into effect on April 1.

The Marble Bay mines are owned by the Tacoma Steel Company, and Mr. Grant received a wire from the Tacoma office on the 18th inst., instructing him to discontinue shipments of ore as the smelter in Tacoma was closed down by reason of a strike.

In pursuance of this order, stoping was suspended on the 25th inst., and the men working in the stopes were paid off. Thereupon, a committee of the union waited upon the manager, Mr. Grant, and intimated that unless their demands were agreed to the union would call the men out of the shaft. Work has since been brought to a standstill.

The company claims that the scale of wages paid at the mine is fair and equitable. The board and lodging for single men at the company's hotel is but \$26 a month, and the option rests entirely with the men whether they stay at the hotel or not. At most of the other mines the men have to pay \$1 a day, or buy their provisions at the company's store, as is the case at the Britannia mine, which is four miles from the beach. The scale of wages paid at the Marble Bay mine is as follows: Machine men, \$3.50 per day, shaft sinking 50 cents per day extra; machine helpers, \$3; shaft sinking 50 cents per day extra; hammer and drill workers, \$3.50; head timber man,

\$1.50; timber men, \$4; log men, \$4; stoker men, \$4; fleet men, \$4.00; assistants, \$3.50; cleaners, \$4.50; blast men, \$4; blacksmith's helpers, \$3; and carpenters, \$3.00. Some men are paid on a contract basis.

Mr. Grant announces that the shipping bunkers are full, and that there is plenty of good ore waiting to be broken up in the southeast end of the big stope.

The men base their claim on the fact that the price of copper is high, and that the company can pay higher wages, and they intend to insist upon their demands being granted, or they will not work.

A NEW PROCESS OF ZINC SMELTING.

ZINC SMELTING by a new process, patented under Patent No. 24,096, 1906, possesses the great advantage over the ordinary process in the fact that metallic zinc is recovered direct from sulphide ores, such as we have in this country, says the *London Morning Review*.

The process consists of heating a mixture of blende with metallic iron at a temperature of 1,060 deg., in an electric furnace, whereby the iron combines with the sulphur of the blende and pure zinc is distilled off in the usual way.

This process has so many advantages over the present one in use, that all those interested in the zinc industry of British Columbia should at once test its practicability.

Amongst its advantages are the following:

1. It is continuous in action, the ordinary method in use is not so.
2. It is specially adapted to zinc ores carrying silver, as the silver is easily recovered from the iron matte by smelting. The residues from the ordinary process are not amenable to smelting for recovery of silver contents, except where very rich.
3. The process is unaffected by the presence of iron in the zinc. In the ordinary process iron is so objectionable that it is penalized when it exceeds a certain amount. The presence of iron in some ores is the chief cause of poor prices and all attempts to remove this have been, practically speaking, unsuccessful in the past. This forms, then, the most important, and to us the most pleasing feature of the process.

4. The plant is easy to erect, capable of being set up in small units, and costs much less than that of an ordinary one. The practicability of the process in British Columbia depends upon the price of iron. In the Slocan, for instance, the mines are too far removed from coal and iron to apply it at them. On the coast, however, where iron can be made and coal and water power are easily obtainable, there is every reason to believe this process would supersede the ordinary method with its expensive outfit and high costs of working.

Wildcat prospecting is a common feature in connection with mining camps where success is greatest and activity most noticeable.

THE FIGHT IN THE UNITED STATES FOR A DUTY ON ZINC ORE.

MINE-OWNERS and others in British Columbia directly interested in having the United States market free to British Columbia zinc ores have, no doubt, read many published opinions, both for and against the imposition of a duty, on them. A little variety has been given to the character of the comments made in newspapers and mining journals by the publication of the following in the *Lead and Zinc News* of Joplin, Missouri, U. S. A.:

The fight of the Joplin operators for a tariff on zinc ore imported into the United States is at an end, with the weight of victory so heavy in the scale pan of the smelters that blindfolded justice is thinking seriously of using her sword arm to support the one with the scales. So the operators think. The smelters have taken a different view and instead of being jubilant about an imaginary victory lay obstinate claim to the truth of the statement that the victory is as big for the producer as it is for the smelters. These widely different attitudes, which have been held throughout the contest, have added a certain variety of humour to the fight which otherwise might have been unrelieved, if it is true, as the smelters say, that the operators have raised a storm of opposition to a policy which in reality is essentially beneficial to their own interests. The reason for their attitude is easily seen and not at all unnatural. They reasoned that an influx of Mexican carbonates would place the smelters in a position of independence highly dangerous to the future prospects of the producers' invested capital. On the other hand, the smelters declare with a smile that the Missouri-Kansas district cannot furnish enough ore to keep the smelters of the country busy and that but for the Mexican and Canadian ores a number of the smelters now in steady operation would have gone to the wall, thus destroying that competition necessary to the maintenance of the present prices of ore.

The adverse conclusions on which the two interests have acted and the difference in the manner of treatment of the question by the producers, who regard it as a question vital to their interests, and the smelters, who regard it largely as a joke at a spot expense to the producers of somewhere near \$10,000, has furnished a piece of light comedy thoroughly enjoyed by the public. Meantime the actual outcome of free ore into this country is awaited with much interest by all concerned.

IMPORTANT MINING DEVELOPMENT IN SLOCAN DISTRICT.

MINING on what is known as the Rambler-Cariboo group, situated in McQuigan Basin, Slocan district, has been carried on under various ownerships over a period of about 14 years. The group has been owned since the spring of 1899 by the Rambler-Cariboo Mines, Ltd., a company

capitalized at \$1,250,000 and having its head office at Kaslo, British Columbia. The total value (gross) of ore taken from this property is about \$1,200,000. There has been practically no production for the three years last past, for during this period important development work has been in progress with the object of making the ore in the lower levels accessible at a much lower cost for delivery at surface than was practicable under the conditions prevailing when this work was undertaken.

The present manager, Mr. W. E. Zwicky, took charge of the mine in 1902. After a thorough study of the known ore bodies in the mine, from which up to that time silver-lead ore having a gross value of about \$800,000 had been mined, he concluded that they continue down to a considerable depth, but it was difficult to induce similar confidence in their permanence among those who would have to finance the costly undertaking of driving a long tunnel at a low level. Eventually, however, it became manifest that costs as greater depth was reached were increasing to such an extent, every additional 100 ft. adding from 20 to 30 per cent., that the manager's recommendations were adopted and the old method of working abandoned. The new plan involved the driving of a cross-cut tunnel between 4,000 and 5,000 ft. with the object of cutting the vein at a depth of about 1,400 ft., or 600 ft. below the bottom level of the old workings. "We had reached the limit of our power plant," reported Mr. Zwicky in June, 1904, "and we had either to drive this long tunnel or put in a new and larger plant so that we could go deeper. To do the latter and sink to the level where the tunnel will cut the vein would cost as much as, or more than, driving the tunnel, beside which our expenses each year would be enormous for pumping alone, as the more ground we opened up and the deeper we got the more water we would have to contend with."

Work on the deep-level tunnel was commenced on July 9, 1904. By May, 1906, a distance of 4,600 ft. had been driven, the dimensions of the tunnel being 9 ft. 6 in. high by 7 ft. wide (7 ft. 6 in. by 7 ft. in the clear). Several small stringers of ore were cut but not the main vein, so as funds were getting low a raise was commenced. At 150 ft. up it entered the vein, giving a depth of 450 ft. below the old bottom level and 1,250 ft. from the surface. Thence up to the old 800-ft. level the raise was made large enough for later use as a 3-compartment main working shaft (12 ft. by 4 ft. 6 in. in the clear).

Early in March of this year it was calculated that the top of the raise was about 18 ft. from the bottom of the old workings, so a drill hole was put up and at 17 ft. it tapped the water. This was regarded as excellent work, but with the workings above full of water from 450 down to 800 ft. Mr. Zwicky took no chances, the safety of the men putting up the raise requiring that a close check be kept on their progress as they approached the flooded old workings. Once tapped, the water took 11 days to run off. It is estimated that it would have cost fully \$10,000 to

have pumped the water out, and then there would have been the necessity for keeping the pumps regularly going or it would have filled again.

By March 20 the mine was completely thrust to the old workings, and now preparations are being made for a resumption of production. Already some ore has been taken out, and as soon as the road down to the railway shall be in good condition for hauling, shipment to the smelter will again take place.

The successful completion of this enterprise, which was the most important mining development ever undertaken in the Slovan district, and probably in the Province of British Columbia, is a matter for much satisfaction to all concerned, and particularly to Mr. Zwick, whose confidence and energy led to results of such moment as to give promise of leading other mine-owners to also develop their mines at depth and so be far-reaching in their good effect upon lode mining throughout the district. The significance of the success attained in this instance will be better appreciated when it is borne in mind that by drifting farther into the mountain, which rises high above the collar of the old shaft, it will be practicable to gain a depth of 2,500 ft., or twice that at which the raise from the deep-level tunnel entered the vein.

It may be of interest to note that machine drills were used, compressed air for operating these having been furnished by a Canadian Rand Drill Company's 14 by 22 D1 air compressor, belt-driven by a 3-ft. 6 in. Pelton wheel running under a head of 750 ft., or a pressure of about 325 lb. to the sq. in.

The rock formation of the district is slate, through which a great boss of granite has been forced up, the whole being much cut by porphyry dykes. A well-defined quartz vein cuts through both slate and granite, and across the contact, and has been traced on the surface for a long distance, in a northeast by north direction, with a dip to the south or into the mountain.

THE DEPARTMENT OF MINES ACT.

HON. WILLIAM TEMPLEMAN, who is named as the minister who will have charge of the new department, has introduced into the Dominion House of Commons "An Act to Create a Department of Mines." The text of this act follows:

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

1. This act may be cited as "The Department of Mines Act."

2. In this act, unless the context otherwise requires,

(a) "Department" means the Department of Mines;

(b) "Minister" means the Minister of Mines.

3. There shall be a department of the Civil Service to be called "The Department of Mines," which shall be under the control and management of a member of the King's Privy Council for Canada, who shall be named from time to time for that purpose by the

Governor in Council, and who shall be called "The Minister of Mines."

4. The department shall administer all laws enacted by the Parliament of Canada relating to lodes and mining, and shall also have the management and direction of all subjects connected with the Mines in Council.

Whenever, under the provisions of this section, the management and direction of any subject is transferred from any other department to the Department of Mines, the minister of mines and the deputy minister of mines shall be substituted for, and have all the powers and perform all the duties of, the minister and deputy minister, respectively, of such other department, as defined and provided by the acts and regulations relating to such subject.

5. The department shall consist of two branches, one of which shall be called the Mines Branch, and the other of which shall be called the Geological Branch.

6. The functions of the "Mines Branch" shall be:

(a) To collect and publish full statistics of the mineral production and of the mining and metallurgical industries of Canada, and such data regarding the economic minerals of Canada as relate to the processes and activities connected with their utilization, and to collect and preserve all available records of mines and mining works in Canada;

(b) to make detailed investigations of mining camps and areas containing economic minerals or deposits of other economic substances, for the purpose of determining the mode of occurrence, and the extent and character of the ore-bodies and deposits of the economic minerals or other economic substances;

(c) to prepare and publish such maps, plans, sections, diagrams, drawings and illustrations as are necessary to elucidate the reports issued by the mines branch;

(d) to make such chemical, mechanical and metallurgical investigations as are found expedient to aid the mining and metallurgical industry of Canada;

(e) to collect and prepare for exhibition in the museum specimens of the different ores and associated rocks and minerals of Canada and such other materials as are necessary to afford an accurate exhibit of the mining and metallurgical industries of Canada.

7. The functions of the "Geological Branch" shall be:

(a) To make full and complete geological survey of the geological structure and mineralogy of Canada, and of its fauna and flora;

(b) to study and report upon the facts relating to water supply for irrigation and for domestic purposes, and to collect and preserve all available records of artesian or other wells;

(c) to map the forest areas of Canada, and to make and report upon investigations useful to the preservation of the forest resources of Canada;

(d) to prepare and publish such maps, plans, sections, diagrams and drawings as are necessary to

illustrate and elucidate the reports of surveys and investigations;

(c) to make a collection of geological and natural history specimens and to classify for exhibition in the museum such specimens as are necessary to afford a complete and exact knowledge of the geology and natural history of Canada;

(f) to carry on ethnological and paleontological investigations.

8. The Governor in Council may appoint a deputy minister, a director of the mines branch, a director of the geological branch, and such other officers and clerks as are required for the proper conduct of the business of the department, who shall be appointed and classified under Schedule A of "The Civil Service Act," and in accordance with and under the terms of section 6 of the said act.

9. Such officers of the department as are continuously engaged in the prosecution of original scientific work or investigation shall be classified as technical officers, under paragraph (b) of Schedule A of "The Civil Service Act," and the Governor in Council may cause to be prepared a list of such officers of the department as are considered to be entitled to be thus classified, with any designations deemed expedient to indicate the scientific work in which they are engaged.

10. No person shall be appointed to the department under paragraph (b) of Schedule A of "The Civil Service Act," unless he is a science graduate of either a Canadian or a foreign university, or of the Mining School of London or the Ecole des Mines of Paris, or of some other recognized science school of standing equal to that of the said universities and schools, or a graduate of the Royal Military College.

11. When the deputy minister reports, for reasons set forth in such report, that assistance of a technical, professional or special character is required in the department, the Governor in Council may, without reference to any examination, or to be age of the person, if the minister concurs in such report, temporarily employ such person at such remuneration as is deemed expedient.

12. Any person appointed to the department shall be appointed on probation and shall not receive a permanent appointment until he has served a probationary term of at least one year, during which probationary term he may be rejected upon the report of the director of the branch in which the temporary appointment has been made; but if he is not rejected, the deputy minister shall signify, in writing, to the minister that he considers the person so appointed competent for the duties of the department, and the appointment may thereupon be made permanent.

13. Persons employed in one section of a branch may be directed by the minister to perform any duty in or with respect to any other section in the same branch.

14. The Governor in Council may, on the recommendation of the minister, assign the present officers of the Geological Survey to the branch in which it is deemed desirable that their services shall be utilized;

provided that the rate of pay or tenure of office as at present existing shall not be impaired or altered by such assignment.

15. Nothing in this act shall be construed to invalidate or interfere with the commissions, as assistant directors, heretofore issued under orders in council to certain members of the scientific staff of the Geological Survey.

16. No person employed in or under the department shall—

(a) Purchase any Dominion or Provincial lands other than for personal residential purposes, except under authority of the Governor in Council;

(b) locate military or bounty land warrants, or land scrip, or act as agent of any other person in that behalf;

(c) disclose to any person, except his superior officer, any discovery made by him or by any other officer of the department, or any other information in his possession in relation to matters under the control of the department or to Dominion or Provincial lands, until such discovery or information has been reported to the minister, and his permission for such disclosure has been obtained;

(d) make investigations or reports relating to the value of the property of individuals, or hold any pecuniary interest, direct or indirect, in any mine, mineral lands, mining works or timber limits in Canada.

17. The directors of the branches shall, as soon as may be after the close of each calendar year, make summary reports of the proceedings and work of their respective branches for the year, and shall also furnish final and detailed reports, to be issued from time to time in such manner and form as the minister directs; and the minister shall cause the said reports to be laid before Parliament, with such remarks, explanations and recommendations as he thinks proper.

18. The department shall be furnished with such books, instruments and apparatus as are necessary for scientific reference and for the prosecution of the work of the Mines Branch and of the Geological Branch.

19. The minister may cause distribution to be made of duplicate specimens to scientific, literary and educational institutions in Canada and other countries, and also authorize the distribution or sale of the publications, maps and other documents issued by the department.

20. The minister may, for the purpose of obtaining a basis for the representation of the mineral, mining and forestry resources and of the geological features of any part of Canada, cause such measurements, observations, investigations and physiographic, exploratory and reconnaissance surveys to be made as are necessary for or in connection with the preparation of mining, geological and forestry maps, sketches, plans, sections or diagrams.

21. Chapter 65 of the "Revised Statutes, 1906," is repealed.

COPPER MINING AN IMPORTANT INDUSTRY IN BRITISH COLUMBIA.

By E. Jacobs.*

COPPER MINING has become an important industry in British Columbia, and that to a far greater extent than in any other province in Canada. The leading position in the Dominion in this connection occupied by this Province is shown by statistics of the copper production of Canada. The subjoined table shows the total production during ten years, 1897-1906, and British Columbia's proportion thereof:



Fig. 1. Boundary—Dominion Copper Co.'s Rawlinson Mine, same District.

Copper Production for Ten Years, 1897-1906.

	Whole of Canada. Lb.	British Columbia. Lb.
1897	13,300,802	5,325,180
1898	17,747,136	7,271,978
1899	15,078,475	7,722,591
1900	18,937,138	9,397,080
1901	37,827,919	27,603,746
1902	38,804,259	29,636,057
1903	42,684,454	34,359,924
1904	41,383,722	35,719,128
1905	48,024,000	37,692,251
1906 (estimated).....	55,000,000	43,000,000
Total	328,787,005	238,318,632

It will be seen that the progress of British Columbia in the production of copper (800 per cent. in 10

years) has been very marked in comparison with that of the remainder of the Dominion (not over 100 per cent.). The considerable increase in 1901 over 1900 was the result of the establishment of copper smelters in the Boundary, the production of which district was 5,672,177 lb. in 1900 (its first year as a producer of copper), and 24,933,751 lb. in 1901. To make complete the record of the total production of the Province in all years the following figures are added: Production in 1894, 324,680 lb.; in 1895, 952,840 lb.; in 1896, 3,818,556 lb.; in 10 years, 1897-1906, as above, 238,318,632 lb.; grand total, 243,444,708 lb. By description this aggregate production was contributed, approximately, as under:

District.	Lb.
Cassiar	310,000
East Kootenay	40,000
West Kootenay	
Nelson	12,300,000
Rossland	63,825,000
Other parts	20,000
	76,145,000
Yale—	
Boundary	135,500,000
Kamloops, etc.	1,420,000
	136,920,000
Coast	30,000,000

The increase in the chief producing districts is shown by the following comparative table, showing the total production in two periods of five years each:

District.	1897-1901. Lb.	1902-1906. Lb.
West Kootenay	31,568,000	39,375,000
Yale	20,225,000	116,693,000
Coast	6,100,000	23,900,000

*Editor British Columbia MINING RECORD.

In West Kootenay the increase was wholly in Rossland camp, Nelson having so fallen off that its copper production during the full period of five years 1902-1906 did not equal that for the year 1901 alone, while the last-mentioned year's production was less than one-half that of 1897. The considerable increase in the Boundary district has been steadily maintained year by year, until the quantity of copper produced reached a total for 1906 more than twice as much as that for 1902. If there be no serious interruption to production in 1907 the advance this year over 1906 will be a substantial one, the producing capacity of the mines and treatment capacity of the smelters being greater now than at

Gribbell and Princess Royal Islands during three years, 1903-5. Last year there was a decided substantial increase, nearly 150 tons having been won, chiefly the product of ore from the Brown-Alaska Company's Outsiders group, situated on Portland Canal, a brief account of which property was printed in the *MINING RECORD* for January last (p. 10). It may be expected that a much larger production will be made during the current year, for the owning company is extending its operations and shipping regularly to its smelter at Hadley, Prince of Wales Island, Southeast Alaska.

IN EAST KOOTENAY.

As yet no important copper mine has been devel-



Rossland. Le Roi Mining Co's Headworks over Main Shaft, in background. Le Roi No. 2 Co's Josie Mine Surface Works and Dumps.

any previous time in their history. On the Coast, too, the outlook is favourable for an increase, the production in 1906 having been larger than in 1905 and the mines giving promise of a still larger tonnage in 1907.

Taking in order the several producing districts appearing in the second of the foregoing tables the following brief review of them may serve to convey a fair idea of their respective positions in the scale of importance as copper producers:

MINES IN CASSIAR DISTRICT.

Prior to 1906 the production of copper in Cassiar district had been restricted to an aggregate of less than 10 tons, derived from ore mined principally on

oped in this district, the chief mineral products of which have heretofore been placer gold, lead-silver ore, and coal. In parts of the district, which covers a large area, copper ore is known to occur, both in the west central section and in the north. The comparatively small total production reported to date has been from ores in which copper has been found in association with other metals.

MINES IN WEST KOOTENAY.

Previous to the development of the enormous low-grade copper ore bodies of the Boundary section of Yale district West Kootenay mines were the main contributors to the total copper production of British Columbia.

Nelson. In 1896-7 Nelson produced about 3,700,000 lb. of copper as against Trail (Rossland) with a production in the same period of about 3,400,000 lb. Thereafter the production of the former decreased; from 3,453,000 lb. in 1897 it fell to 22,600 in 1905. Last year, however, there was a partial recovery, with a production not far short of 220,000 lb. With several properties only lately on the producing list, the expectation is that this division will make a better showing in 1907. The Silver King will probably produce more this year than for

the belief that they will continue to be productive for many years. The Le Roi No. 2 similarly in degree gives much promise of proving a profitable mine over a considerable period.

The development and progress of mining in this camp is reflected in the following table of production:

	Ore. Tons.	Smelter returns.	Value per ton.
1894	1,856	8 75,310	\$40 60
1895	19,694	792,457	35 67
1896	28,073	1,243,360	32 65



Rossland, B. C. 1. The Rossland Smelter; 2. The Rossland Hoist House; 3. The Rossland Hoist House, etc.

several recent years; the Dandy may be placed on the shipping list; the Eureka should improve on the modest production that resulted from its operations last year; and the Queen Victoria, now in its first year as a shipper, gives promise of adding considerably to the output of copper ore from Nelson district mines.

Rossland. The leading feature of Rossland camp today is that several of the mines in it are being developed at considerable depth, the Le Roi at about 1,500 ft. and still going deeper, and the Centre Star-War Eagle at about 2,000 ft. with sinking also still in progress. Large bodies of ore have been met with in the lower levels of these mines, which are regarded as amply warranting confidence in their permanence, with resultant operations on a scale in keeping with

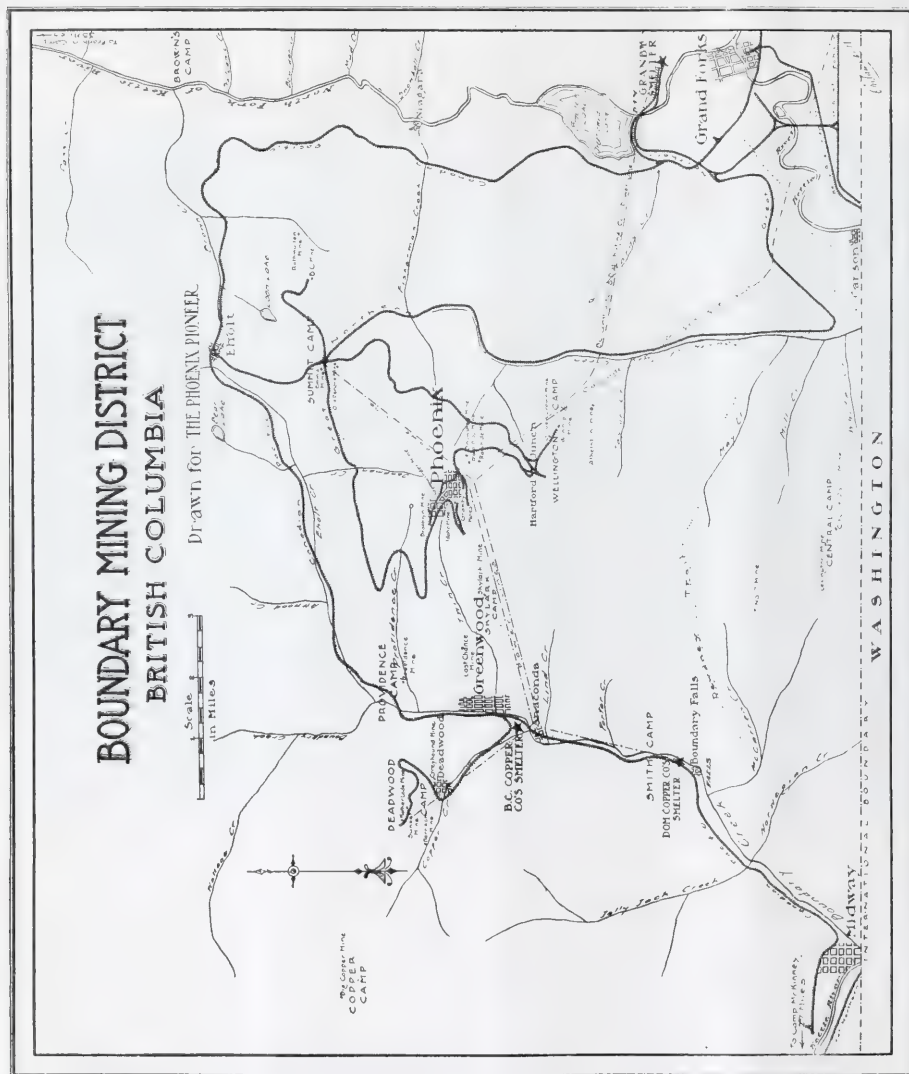
1897	68,804	2,097,280	30 48
1898	111,188	2,470,811	22 30
1899	172,665	3,229,086	18 70
1900	247,340	2,739,300	11 59
1901	283,360	4,621,299	16 31
1902	270,000	4,893,395	14 80
1903	160,780	4,255,958	11 80
1904	312,391	3,760,866	12 01
1905	100,818	3,672,828	11 10
1906 (estimated) ..	277,361	3,672,828	12 00

Total 2,624,661 \$37,090,482 \$14 13

Considerably reduced mining costs and smelting charges have induced the mining of much ore of a poorer grade than under former conditions, hence the

lower average value of the ore shipped. It should be noted that the chief value in Rossland ore is gold; this accounts for the wide difference between the total value of copper produced by the mines of this camp being so much smaller than that above shown as total smelter returns from ore shipped. Official re-

following comparative figures are submitted: Average metal contents of 128,428 tons of ore, being the total production of the first four years (1894-7) of mining in this camp: Gold, 1.46 oz. per ton; silver, 1.96 oz. per ton; copper, 1.73 per cent.; average value per ton, \$32.05. Average contents of 330,618



Map Showing Location of Mines, Smelters, Railways, etc., in part of Boundary District.

turns for 1905 show the following proportions of values in that year: Gold, \$2,683,855; silver, \$84,707; copper, \$904,266; total value of 330,618 tons, \$3,672,828. As further illustrating the effect of mining and smelting under conditions now prevailing as compared with the high costs of 10 years ago the

tons of ore shipped in 1905: Gold, 0.39 oz. per ton; silver, 0.44 oz. per ton; copper, 0.9 per cent.; average value per ton, \$11.10.

The proportions of the various mines of the foregoing aggregate tonnage of ore shipped are, approximately, as under:

Mines.	Tons of Ore.
Le Roi	1,500,000
Centre Star and W. Eagle	930,000
Le Roi No. 2	775,000
Juniper	31,000
Iron Mask	18,000
Rosland Kootenay	13,000
Rosland Great Western	13,000
White Bear	8,000
Velvet-Portland	8,000
Spitzer	7,000
Giant	5,000
Miscellaneous	7,000
Total	2,625,000

The "Preliminary Report on the Rosland, B. C., Mining District," by Mr. R. W. Brock, of the Geological Survey of Canada, which was reprinted in the *MINING RECORD* for June, 1906, (pp. 219-239), contains much detailed information concerning this camp. For full particulars of an individual mine an article entitled "The Le Roi Mine—its Past



Boundary—Part of Granby Co.'s Mines—P. Pioneer.

History and Present Condition," published in this journal last November (pp. 428-437), will also be of value to those desiring to familiarize themselves with the general conditions in this camp.

The production of copper in other parts of West Kootenay has been too small to call for notice of the several properties from which an aggregate of only about 10 tons has been obtained during the period under review. This quantity came partly from each of the following sections: Ainsworth, Slocan, and the northern portion of the district.

BIG MINES IN BOUNDARY, VALLEY DISTRICT.

The most striking development of the copper mining industry in Canada is that which has taken place in the Boundary district of British Columbia during seven years, 1900-1906. Perhaps the most convincing evidence that can be adduced in support of this statement is the record of copper recovered from ore produced by district mines. The following table gives

the official figures, taken from the "Annual Report of the Minister of Mines for British Columbia," for the several years 1900-1906, separately and under running.

Year.	Copper.	Value.
1899	None.	
1900	14,511,787	\$ 918,334
1901	14,511,787	918,334
1902	14,511,787	1,739,334
1903	18,180,644	2,440,361
1904	19,066,407	2,828,913
1905	17,670,644	4,313,853
1906 (subject to re- vision)	22,000,000	6,186,960

Total Lb. 135,362,139 \$20,771,795

This production of 68,000 tons of copper does not, however, of itself convey an adequate idea of the extent of mining and smelting operations in the district. To those familiar with conditions usually prevailing where a large tonnage of ore is regularly produced the next following table will better indicate the importance of the larger mines of this district. The *Phoenix Pioneer*, established in the district and publishing weekly generally reliable information relating to local mining and smelting industries, shows the ore production to have been as under:

Year.	Tons.
1900	10,000
1901	100,000
1902	308,840
1903	500,410
1904	800,808
1905	946,008
1906	1,158,991

Total 4,609,042

Four copper-mining and smelting companies are operating in the Boundary on a producing basis. Three of them own several mines each; the fourth—the Consolidated Mining and Smelting Company of Canada, having mines in East and West Kootenay and smelting works at Trail—is working the Snow shoe mine under lease with option of purchase. The total tonnage of ore, comprising the aggregate shown above, produced by the several groups of mines is, in round numbers, as follows:

	Tons.
Granby Company	3,005,000
B. C. Copper Company	1,073,000
Dominion Copper Company	390,000
Snowshoe	102,000
Sundry smaller shippers	40,000

Total 4,610,000

Included among the smaller shippers are some 20 properties which have together produced about 15,000 tons of quartz ore carrying silver or gold values but no copper. With this small exception the output of the district, shown above, has been ore having more or less copper as its valuable metal content.

It is not intended to here give a description of the big copper mines of the Boundary, much as they

merit such prominence, both in connection with the size of their ore bodies and the unusually low cost of mining here established. The latest publication giving much interesting detail concerning these mines is the *Phoenix Pioneer's* "Fourth Annual Holiday Number,"* several of the illustrations from which are, with the courteous permission of the editor of the *Pioneer*, here reproduced. Brief mention, however, will be made of the properties of the larger companies.

Granby.—The Granby Consolidated Mining, Smelting and Power Company, Ltd., owns a large

miles. In addition, diamond drilling has been done, with a total of rather more than 26,000 lin. ft. The number of men employed at these mines at the present time is about 525 and the monthly pay-roll on this account is quite \$50,000. The mine equipment includes much modern machinery and plant, such as two Canadian Rand Drill Company's cross-compound duplex air compressors, together equal to operating 60 3 1/4-in. machine drills, and driven by two Canadian Westinghouse Company's 700-h.p. induction motors; electric locomotives and complementary appliances for hauling ore from mine workings to rail-



One of Granby Co.'s Ore Quarries. Steam Shovel Handling Ore near one of the Tunnels.

group of mineral claims at Phoenix, 30 or more, with an aggregate area exceeding 1,000 acres. To date the greater part of the 3,000,000 tons of ore this company's mines have produced has been taken from above the 400-ft. level, much of it from immense quarries in an ore body in places 400 ft. in width. The number of lineal feet of development work done—sinking, raising, cross-cutting, and drifting—exclusive of open-cut or "glory-hole" work, which has of itself been extensive—now exceeds 42,000, or eight

way terminals; three Farrel Bacon ore crushers with jaw openings 42 by 32 in., driven by 100-h.p. induction motors and having a capacity of 150 tons of rock per hour crushed to a maximum size of 8 in.; steam shovels for work in the ore quarries; and much other plant and labour-saving machinery to admit of large production at low cost. The output capacity of the mines is stated to be up to 5,000 tons of ore per day, but heretofore the treatment capacity of the company's smelting works having been less than 3,000 tons per diem, the mines have not produced the larger tonnages for which they are equipped and have been developed.

**Pioneer's* Fourth Annual Holiday Number—a Record of Progress in the Boundary Mining District, B. C." Issued by the *Pioneer*, Phoenix, B. C. Price 25 cents.

The Granby smelter is situated at Grand Forks, distant from the mines about 20 miles, on a steep grade (a half, by rail, connecting railways). There are eight blast furnaces, together having a combined capacity of nearly 1,000 tons of ore per day. Recent enlargements of several of these furnaces have increased the total capacity of the works to the quantity mentioned. Furnace charging is by a mechanical system, electrically operated, the charge cars being moved along tram tracks between ore and coke bins and the furnaces by 20-h.p. Westinghouse electric locomotives. Slag is dumped hot, slag pots being hauled to and from the dump by steam locomotives. Blowers for the blast furnaces include the "Jumbo," which is the largest size made, having a capacity of 30,000 cu. ft. of air per min., double drive and operated by two 150-h.p. induction motors. The copper matte is converted into blister copper at the works, the converter department also being equipped with modern plant and machinery. In fact these re-

cent years (1904-1906) have done much for the industry at Greenwood. Other mines it is operating are in Summit camp, also having railway connection with the smelting works. Smaller quantities of ore are obtained from two mines it is working, situated across the International Boundary line in the neighbouring State of Washington.

The Mother Lode ore body shows a width on the surface of 80 to 100 ft., and is known to extend along a dip-slope of about 2,000 ft. to where it dips under heavy drift. The accompanying illustration shows the big quarry opened from the surface. Levels have been opened at 60, 200, 300 and 400 ft. depth, respectively. The main four-compartment shaft is 475 ft. in depth. Prospecting with the diamond drill having proved the continuance of large ore bodies at depth, development work is being pushed on the lower levels for the purpose of making these additional supplies of ore also available. The present output capacity of this mine is about 1,000 tons per month, and



Boundary—Dominion Copper Co. (Photo by J. H. H. H.)

tion works all through are up to date, thus enabling the production of copper at a cost surprising to metallurgists not acquainted with local conditions and capabilities. Some 350 men are employed here, the monthly wage payments totalling about \$35,000.

It is noteworthy that the Granby Company declared four dividends in 1906, the total amount of profits thus distributed having been \$1,215,000. With copper remaining at the average price of the last two years and no serious interruption to a continuance of mining and smelting operations this company may be expected to keep up a profit-earning record similar to that of 1906.

B. C. Copper.—The British Columbia Copper Company, Ltd., has mines in several Boundary camps. Its chief source of ore supply is its Mother

preparations are being made to increase it. The mine equipment includes a 40-drill air compressor, for the driving of which electricity has lately been substituted for steam. It is proposed to make a similar change in connection with the big double-drum hoisting engine. There are two large ore crushers here, of similar make to those mentioned as at the Granby mines. Mother Lode ore shipments to date aggregate about 850,000 tons.

The mines this company is operating in Summit camp are the Emma, Oro Denoro, and B. C. The main incline shaft at the Emma is nearly 300 ft. in depth. On the 150-ft. level there is an ore body consisting of 30 to 40 ft. of solid magnetite carrying copper values, while another important shoot of ore has been entered by the diamond drill. During five

years total shipments of between 90,000 and 100,000 tons of ore have been made from this mine. The Oro Denoro adjoins the Emma. It has shipped between 40,000 and 50,000 tons of ore. The development work done has disclosed the occurrence of much more ore, so that it may be regarded as another source of supply for the smelter at Greenwood for years. The first rock breaker of English manufacture used at a mine in this district is one made by Hadfield's Steel Foundry Company of Sheffield, England, and recently installed at this mine. The size of its receiving opening is 24 by 18 in. and its crushing capacity exceeds 150 tons in 10 hours. It was supplied by Peacock Bros., engineers, Montreal, Quebec, sole Canadian agents. The B. C. mine during four years, 1900-1903, shipped rather more than 100,000 tons

hearth area of each furnace is 48 by 240 in. Furnace charging is by side-dumping cars hauled by 6-ton trolley locomotives. The blast for each furnace is supplied by a separate large Roots' rotary blower. Three 300-h.p. Westinghouse induction motors drive the blowers. Molten slag is hauled to the dump in 25-ton cars by 15-ton Baldwin-Westinghouse electric locomotives. The standard-gauge slag cars, each of which has an electric motor for tilting the car when dumping the slag, were brought from the factory in Pennsylvania over the railways a distance of 3,000 miles on their own wheels.

The B. C. Copper Company, like the Granby, possesses its own bessemerizing plant, which converts the 45 per cent. copper matte into blister copper 99 per cent. fine. The plant consists of two converting



Boundary—Snowshoe Mine, showing (1) Head Frame over Main Shaft; (2) Railway Ore Bus; (3) Old Surface Works

of ore of generally higher grade in copper than that produced by the larger mines of the Boundary. The average assay value of 67,000 tons of roughly sorted ore, shipped to the smelter at Trail in 1900-1901, which was before the local smelters were ready to take much custom ore, was: Gold, 0.015 oz. per ton; silver, 2.45 oz. per ton; copper, 5.8 per cent. Unsorted ore afterwards sent to local smelters averaged: Silver, 1.75 oz. per ton; copper, 4.1 per cent. The mine was purchased by the B. C. Copper Company in 1906 after having been inoperative for three years.

The company's smelter at Greenwood was last year much improved by the remodelling of its blast furnace plant and other additions of modern machinery facilities for economical smelting. Three blast furnaces, having a nominal treatment capacity of 600 tons per diem but in actual practice treating 700 tons, have been erected, thus giving the works a total capacity of about 2,000 tons every 24 hours. The

stands, equipped with shells of the trough type 84 in. diameter and 126 in. long. The blast for the converters is furnished by a Nordberg blowing engine having a capacity of 5,000 cu. ft. of air per minute. The whole plant—furnaces and converters—is housed in a steel-frame building.

The company employs at its several mines and smelter about 425 men, of which number 300 are at work at the mines. The monthly payroll payments total from \$40,000 to \$50,000.

Dominion.—The Dominion Copper Company, Ltd., owns several groups of claims situated in Boundary mining camps. Its producing mines are the Brooklyn, Stenwinder, Idaho, and Rawhide, at Phoenix; Sunset, near Greenwood; and Mountain Rose, in Summit camp. The Morrison mine, in Deadwood camp, from which about 3,500 tons of copper ore were taken in 1903, has not been operated by the company owing to its not having railway

transportation facilities. Another property, the Athelstan, has shipped about 12,000 tons of ore, the chief value of which is in gold. The Brooklyn and Stenwinder, adjoining mines, have been the company's largest producers thus far; their output in three years, 1904-6, having totalled 279,000 tons. The Idaho, also adjoining the Brooklyn, commenced shipping late in 1906 and sent about 3,000 tons to the company's smelter. This mine is being opened up with the expectation that it will produce largely in future. The Rawhide, distant about a mile from the Brooklyn-Stenwinder group, shipped 5,000 tons in 1904 and by the end of 1906 had increased its total output to 54,000 tons. The Sunset, which lies close to the B. C. Copper Company's Mother Lode mine, has shipped during several years a total of 79,000 tons, of which 48,000 tons were produced in 1906. The Mountain Rose has sent out 10,000 tons,

when a period about the same approximates indicates that this mine will probably be the main source of supply for the company's smelter until the Idaho shall have been extensively opened up. The Sunset group is now having more attention; the Crown Silver, lying between the Sunset and Mother Lode, is again being worked after having been inoperative for several years. The ore reserves at the mines above-mentioned are stated to be sufficient to supply 1,200 tons daily for several years.

The company's smelting works are situated at Boundary Falls, three miles south of Greenwood. Two blast furnaces, together having a treatment capacity of 600 to 650 tons per day, have been in operation for some time. The installation of a third and much larger furnace is approaching completion. It is the largest copper-smelting furnace yet erected in British Columbia, and is equipped with Giroux hot



Boundary. B. C. Copper Co.'s Mother Lode Mine. (Fig. 101. C. W. Wilson and Thomas H. ...)

The aggregate production to end of 1906 of the Dominion Copper Company's mines is thus shown to have been 390,000 tons.

The Brooklyn mine has been developed by levels down to 350 ft. depth and its main shaft is 75 ft. deeper still. Connection has been made on the 250-ft. level with the Idaho. A steam power plant at the Brooklyn has heretofore been used in the development of both mines, but a new plant, installed at the Idaho, will supply most of the power for these mines and the Rawhide as well. Included in this central plant are a 25-drill air compressor, driven by electricity, and a double-cylinder double-drum hoisting engine. A 5-drill electrical air compressor has been in use at the Rawhide for more than a year, but this is now altogether too small for that mine's requirements. Several tunnels driven on the Rawhide have proved the occurrence of immense bodies of ore and further prospecting is disclosing the existence of

blast, in which respect it also stands alone in the Province. Its dimensions are 255 by 44 in. and it has 22 $3\frac{1}{2}$ -in. tuyeres. Its daily capacity is calculated to be about 800 tons. It will be fed mechanically, using side-dumping steel cars drawn by electric locomotives. The ore will be crushed by a large Farrel crusher of similar style to those in use at the Granby and Mother Lode mines. Electric power is superseding steam at these works, the 80-mile 60,000-volt circuit connecting the Boundary district with the generating station at Bonnington Falls supplying the current. When the new equipment shall be in good running order it will be practicable, in the opinion of the company's consulting engineer, for the Dominion Copper Company to mine and smelt at a profit ore carrying as small a percentage of copper as one per cent.

Snowshoe.—The total production of this mine to the end of 1906 was about 102,000 tons, of which

8,400 tons were mined by the Consolidated Mining and Smelting Company of Canada during the latter part of last year. Production at an average rate of 1,200 tons weekly is the record for the present year. The mine has been opened to 350 ft. depth; altogether between 7,000 and 8,000 lin. ft. of development work have been done. Large shoots of ore are known to occur. The lease granted to the Consolidated Company, upon royalty, is for a period of two years—to the summer of 1908—or until 125,000 tons of ore shall have been extracted. The power plant includes

of the Boundary district in which are found the above-mentioned mines.

Iron Mask at Kamloops.—This mine is in Yale district, though not in the Boundary section. It is idle now after two or three years' activity. During the period mentioned a concentrating plant was installed and a total production of about 680 tons of metallic copper made. Ore and concentrates were smelted at Trail. A small smelting plant erected at the mine is stated to have been ineffective. The tonnage of ore produced in 1905 was about 14,600 tons;



Britannia Mines.—Mammoth Bluff before breaking down for shipment of this Enormous Body of Ore.

the first half of a 30-drill air compressor and a 150-h.p. electric hoisting engine. In other respects the mine is well equipped, and as a railway crosses the property transportation facilities are convenient.

Franklin Camp.—This camp, situated on the east branch of the north fork of Kettle River, about 43 miles by road from Grand Forks, both in the nature of its ore deposits and geology, is stated by Prof. R. W. Brock* to bear a strong resemblance to that part

the figures for 1906 are not yet available, excepting that the Kamloops Board of Trade has reported shipments to have been 128 cars. Underground development work has been extensive and large ore bodies are known to exist. No reason for the suspension of work has been made public but it is understood that the cash capital at the disposal of the management was insufficient to provide for operating requirements.

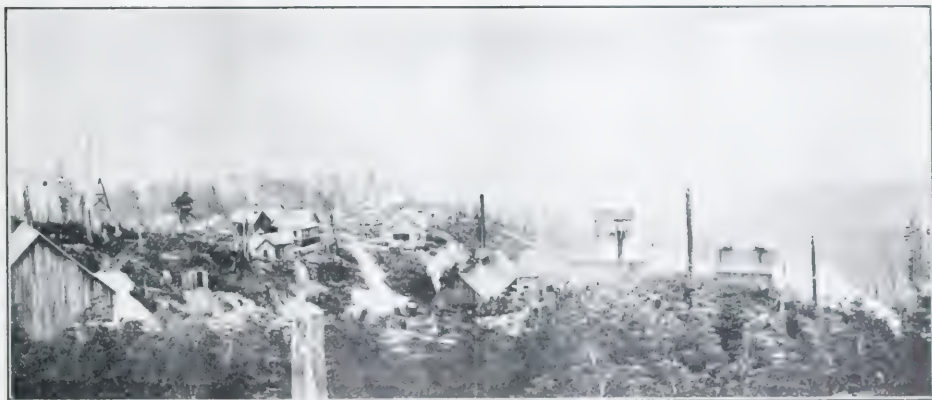
COAST COPPER MINES.

The Coast mines producing copper in large quantity are not numerous. The Britannia on Howe

*See "Summary Report of the Geological Survey Department of Canada for 1906," pp. 62-5.

Sound, Marble Bay mine on Texada Island, and Tyee on Vancouver Island were the important producers in 1906. Recently the Richard III, near the Tyee, commenced making shipments. There are several promising copper properties, not yet developed to any considerable extent, on both Texada and Vancouver Islands, and others that in past years have shipped ore on a commercial scale, these latter including the Van Anda mines (Cornell and Copper Queen) on Texada Island, Lenora at Mt. Sicker on Vancouver Island, and Monitor and Yreka on the west coast of the latter island. Mention has already been made of copper mining properties in the northern part of the coast district of the Province so no further reference will be made to them now. An omission should be rectified, though—the Hidden Creek group on Observatory Inlet, an arm of Portland Canal, should have been noticed. Some infor-

"The Britannia Copper Syndicate's mines are 2.8 miles from the beach, and 3,300 ft. above sea level. The company has 8,500 ft. of lode which has a maximum width of 600 ft. The deposit is essentially a low grade proposition, but the enormous amount of ore in sight, and its situation, present most favourable advantages for economic mining and large output. At present the ore is mined only on the Jane claim at the Jane bluff and Mammoth bluff. The method of mining is by tunnels, cross-cuts and stopes, and glory holes. The ore is conveyed to the beach by a Riblet aerial tramway, the shipping ore going directly to the bunkers and the concentrating ore to the mill. About 350 tons a day are mined at present, but it is the intention of the company to greatly increase the output at an early date. The ore is shipped to the Britannia Smelting Company's smelter at Creston, Vancouver Island).



Surface Works of Tyee Copper and Tyee Mine at Mt. Sicker, Vancouver Island.

mation relative to this property will be found on another page of this issue.

Howe Sound Mines.—Concerning mining properties on Howe Sound, Mr. O. E. LeRoy of the Geological Survey of Canada, last year reported as under:*

"The Britannia mineral zone lies on the east side of Howe Sound 23 miles from the entrance. The zone has a width of one and one-half miles along the shore and extends inland about eight miles. The rocks are conglomerates, quartzites, slates and sericite schists. The mineralization is confined almost wholly to the silicified sericite schists. The ores are mainly chalcopyrite and pyrite, the former occurring in lenticular areas and masses while the latter is finely disseminated through the schist and quartz. Both carry appreciable values in gold and silver. On the western half of the zone there are three principal groups, the Goldsmith, Britannia and Empress.

"The Empress mine lies east of the Britannia, across the divide, in South Valley. Development work, principally by tunnelling, is being carried on with a view of reaching the shipping ore as soon as possible.

"The Britannia West Copper Company's property is situated on the west side of the sound and almost due north of Britannia Beach. The ore body is 1,500 ft. square and consists of an impregnated zone in granite porphyry. Small quartz veins are numerous and carry bornite. At present the company is engaged in building a tram line from the mine to the beach, and in constructing a concentrating mill and other mine buildings, and no ore will be mined until these are completed."

Additional information relative to the Britannia mine and smelter is as follows: In 1905 an aerial tramway was constructed down to deep water, power machinery installed at the mines, a hydro-electric station established, a big crushing and concentrating plant (with 65 tables) placed at Britannia Beach,

*See "Summary Report of the Geological Survey Department of Canada for 1906," pp. 32-3.

shipping facilities provided, and the smelter at Crofton, Vancouver Island, purchased. In 1906 production totalled 108,398 tons of copper-gold ore; of this quantity, 42,552 tons were shipped to the smelter as crude ore, while from the remaining 65,844 tons, milled at the company's concentrator, 12,612 tons of concentrates were obtained and sent to the smelter.

At the Crofton smelting works there are two blast furnaces of a stated daily capacity of about 350 tons each, also a 65-ton cupola for re-melting matte. The copper converter plant consists of one converting stand, with four shells of the trough type 84 in. diameter and 126 in. long.

Texada Island Mines.—Statistics of total production of copper ore from Texada Island mines have not been published during recent years. It is probably more than 100,000 tons, contributed as to about one-fifth by the Van Anda mines—Cornell and Copper Queen—and four-fifths by the Marble Bay mine. In his report Mr. LeRoy says of Texada Island (see pp. 33-4), which he visited last summer:

"At present the only producing mines on the island are the Marble Bay, owned by the Tacoma Steel Company, and the Cornell, operated under lease by a Seattle syndicate. The Puget Sound Iron Company's magnetite deposits, and the Copper Queen mine, both of considerable promise, have not been worked this (1906) season. The Loyal and Commodore mines are still engaged in development work, and have not yet reached the shipping stage.

"The Marble Bay mine is now 760 ft. deep, and the ore shoot at that level is more than 40 ft. long, with a maximum width of 20 ft. The ore is mainly bornite, which is disseminated through green felsite and garnetite. The copper, gold and silver values have steadily increased with depth. About 1,100 tons a month are mined and shipped to the smelter at Tacoma.

"In the early part of the summer the Cornell mine was pumped out down to the 260-ft. level. The ore on the 160 and 260-ft. levels is being stoped out and shipped to the smelter at Ladysmith. The present output is between 500 and 600 tons a month. The ore and its mode of occurrence are similar to those of Marble Bay."

Writing recently Mr. W. M. Brewer, whose paper on the "Occurrence of Deposits of Copper Ore on the North Pacific Coast" was reprinted in the last month's number of the MINING RECORD (p. 62), made the following observations relative to these mines:

"During the past year development work and shipment of ore has been carried on continuously, especially at the Marble Bay mine, where the lowest depth reached is, today, about 900 ft., and the lowest level where stoping is done, 760 ft. From reliable information I am of the opinion that further prospecting along the contact of the limestone and felsite on these deeper levels will demonstrate the occurrence of other ore bodies. In fact, on the 680-ft. level of the Copper Queen mine, such has been the case, while at the Marble Bay the ore body shows

every indication of trending more directly toward the ore body on the adjoining Copper Queen, than it did when an examination of both properties was made by me some four years ago."

Vancouver Island Mines.—Of Mt. Sicker, where chalcopyrite ore occurs in association with iron pyrite, barite or heavy spar, and a small percentage of lime, and where mining operations have been carried on since 1899, Mr. Brewer remarks (p. 65):

"The principal mines opened are the Tyee, from which about 200,000 tons of ore have been mined and treated; the Lenora, which has produced some 50,000 or 60,000 tons of ore; and the Richard III, now being actively operated after having remained idle for about two years. Of these mines the Tyee has been the most important. It has been in continuous operation since 1900, and the development has been carried on to a depth of 1,250 ft.

"The occurrences of ore on Mt. Sicker in the schist country rock afford an interesting study to the geologist, as well as to the metallurgist; to the former, because, notwithstanding the large extent of the ore bodies, especially in the Tyee mine above the 300-ft. level, no other ore was discovered until the 1,000-ft. level was reached so far as exploitation has shown, and this has been carried on very thoroughly between that level and the 1,250-ft. level; to metallurgists, because of the high percentage of barium sulphate (about 40 per cent.) that occurs in the gangue.

"Below the 1,000-ft. level in the Tyee mine, ore of practically the same character, but of lower grade than in the upper levels was exposed down to the 1,250-ft. level. At present development work is being carried on at these levels, while the main shaft is being sunk to the 1,400-ft. level and ore mined from above the 300-ft."

At the Tyee mine cost of mining per ton of ore shipped during two successive years was as under:

Stoping and raising ore.....	\$1.359	\$1.325
Proportion for development.....	0.499	0.485
Surface work	0.124	0.220
Ore dressing	0.041	0.040
Transportation to railway (aerial tram)	0.150	0.140

Total cost of ore delivered at

E. & N. Railway.....	\$2.173	\$2.210
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The timbering in this mine is exceptionally substantial and good, sawed square-sets being used. The power plant is sufficient and modern. An aerial tramway conveys the ore 3 1-3 miles to the railway whence it is hauled in bottom dump-cars to the smelter at Ladysmith, distant 17 miles from the lower terminal of the tramway.

The exceptional character of the ore from the Tyee mine is indicated in the following excerpt from a report by Mr. W. F. Robertson, provincial mineralogist:*

*"Annual Report of the Minister of Mines for 1903," pp. H 207-8.

The report of the manager of the Tyee Copper Company's smelter at Ladysmith, Mr. Theo. Robbie, is exceedingly interesting from a metallurgical standpoint, as showing the practical results obtained in smelting an ore carrying over 35 per cent. of barium sulphate, a problem, as far as can be learned, not met with outside of this camp. The following figures show the results of the first few months run on this ore, which, as just intimated, is unique in character, and concerning which no previous results were obtainable as a guide; consequently, as must be recognized, the work was largely experimental:—

"Ore receipts from September 22, 1902, to April 30, 1903:

Copper-bearing ore (roughs)	15,060.725 tons.
Copper-bearing ore (fines)	5,173.785 "
Total	20,234.510 "

"The average assay of this ore was:—

Copper (wet assay)	4.43 per cent.
Silver	2.76 oz. per ton.
Gold	0.12 "

"Other receipts were as follows:

Schistose flux ore	1,340.9 tons.
Sandstone	396 "
Iron ore	551 "
Coke	2,346 "

"Burnt Ore.—The average analysis of the burnt ore delivered to the smelter was as follows:—

Iron	10.44 per cent.
Zinc	8.14 "
Alumina	3.61 "
Barium sulphate	34.08 "
Magnesia	trace.
Lime	3.46 "
Silica	22.51 "
Combined sulphur	7.42 "
Total sulphur	13.86 "

"During the last quarter of the fiscal year the burnt ore showed on analysis an increase of:—Iron, 1.86 per cent.; zinc, 0.93 per cent.; barium sulphate, 7.66 per cent.; lime, 0.5 per cent.; combined sulphur, 0.54 per cent.; and a decrease in silica of 11.49 per cent."

The Tyee Copper Company's smelter as constructed is of 250 tons daily treatment capacity, but in the erection of the main buildings provision was made for enlargement to 600 tons capacity and room was left for a bessemerizing plant whenever the quantity of ore available shall warrant the installation of the additional machinery, etc., requisite for the treatment of this larger tonnage, and for converting the matte into blister copper at the works. Before Mr. Kiddie resigned the management of the smelter, in 1905, he installed here the Kiddie Hot Blast System.

As a company was lately registered in England with the object, it is reported, of acquiring and working the Lenora mine, which adjoins the Tyee, the following excerpt may be of interest in this connection: "The Lenora was the first property in this district to assume any commercial importance. The

work of prospecting was commenced in 1897. In 1898 the Lenora Mount Silver Mining Company was organized to acquire and develop the mine. Full particulars of ore shipments are not available, but a statement prepared by the management of the company, and published in the *Annual Report of the Minister of Mines for 1902* (pp. II. 248-9). This showed that the average assay value per ton of 26,195 tons of shipping ore was: Gold, 0.1707 oz.; silver, 3.57 oz.; and copper, 7.95 per cent. (wet assay). Besides this first-class ore, there were about 52,000 tons of second grade, the bulk of which has since been smelted, of an estimated average assay value per ton of: Gold, 0.05 oz.; silver, 1.03 oz.; and copper, 2.3 per cent. (wet assay)."

Development work was resumed on the Richard III mine, situated a short distance east of the Tyee, (the Lenora adjoins the latter on the west), last October after a suspension of operations over a period of two years and six months. A cross-cut was driven at a depth of 330 ft., corresponding to the 100-ft. level of the Tyee, which lies lower down the mountain. The extension of the Tyee ore shoot into Richard III ground was encountered later, and since then the production of ore on a comparatively small scale has been regularly maintained. A report published recently was to the effect that the new workings were in ore of good value, net smelter returns from eight carloads having been about \$21 per ton. It is expected that the output will ere long be increased to 60 or 70 tons per day. The work done in earlier years included sinking a two-compartment shaft 500 ft. and opening four levels from it. Some 1,500 tons of ore were taken from between 400 and 500 ft. depth, but the shoot gave out and no considerable body of ore was again met with until lately.

CONCLUSION.

Of course there are many copper-bearing properties in various parts of the Province that give promise of becoming productive on an appreciable large scale after adequate development shall have been done, but the purpose of this article has been to deal with the mines that are or have been producing ore in such quantity as to make them of considerable importance from a commercial point of view, rather than to give a long list of, with an accompanying running commentary on, numerous claims, many of which have been proved to be ore-bearing and not a few shipped from a carload to several hundred tons of ore. Incidentally, brief particulars of the copper smelters of the Province have been given, these serving to show that not only are there good copper mines in British Columbia, but as well modern reduction works and some of them of large capacity.

According to the report of Mr. Edward W. Parker, *Statist of the United States Geological Survey*, the production of coal in 1905 amounted to 392,919,341 short tons, having a value at the mines of \$476,756,963, surpassing in both quantity and value all previous records in the history of the country.

THE CANADIAN MINING INSTITUTE.

Proceedings at the Ninth Annual Convention.

THE NINTH ANNUAL MEETING of the Canadian Mining Institute was opened on March 6, at the King Edward Hotel, Toronto. This was the second meeting held in Ontario, the institute having met in Toronto in 1904.

The following report of the proceedings is from *The Engineering and Mining Journal*, New York. It was prepared for that journal by Mr. Frederick Hobart, associate editor:

THE FIRST DAY.

The morning session was devoted chiefly to routine business. President George R. Smith delivered a brief annual address, in which he spoke of the great progress of the mineral industry of Canada in recent years. He called especial attention to the late developments in Ontario, especially in the Cobalt district, and the extraordinary increase in the mineral production of that province. He also referred to recent changes in the mining laws of the provinces, and to the proposed measures for taxation of mining property.

The report of the treasurer showed a balance of about \$1,300, after paying all claims.

The report of the council covered the work accomplished during the year, and continued as follows: "It is gratifying to be able to record an important increase, of approximately 20 per cent. in the membership during the year, which now, including students, for the first time exceeds 500 names. This may be regarded as indicative of appreciation and recognition on the part of those engaged in the development of our mineral resources, of the useful work this institute is attempting to perform in the interests of mining in the Dominion.

"Pursuant to a resolution unanimously passed at the Quebec meeting, requesting the president to appoint a delegation to wait on the Dominion Government and urge the desirability of the early establishment of a Federal Department of Mines, under the direct supervision of a responsible minister, a deputation consisting of Messrs. Smith, Adams, Porter, Drummond, and Brown, proceeded to Ottawa on April 18, 1906, and presented the views of the institute to Sir Wilfrid Laurier and his colleagues, by whom they were most favourably received. Within a few weeks of this interview, the office of director of the Geological Survey of Canada, which had remained vacant since the death of the late Dr. George Dawson, was filled by the appointment of A. P. Low, whose interest in that branch of geological science which deals more particularly with the solution of economic problems, is well known. The work of the Survey during the past year under Mr. Low's direction has been of an eminently useful and practical character; and the appointment of that gentleman to the head of the Survey is a matter for congratulation. Following the appointment of Mr. Low, the Survey was disassociated from the Department of the Interior, and placed under the ministerial charge of

Hon. William Templeman. Although, as yet, the bill for the establishment of a Department of Mines has not been introduced into Parliament, it is understood that such a measure is now under contemplation, and it is hoped, therefore, that before another year shall have passed, the wishes of the mining industry in this important respect, will have been realized.

"During the year an addition of some 50 volumes was made to the library, and a number of exchanges, including transactions of technical societies, official reports and periodicals, covering a period of three years, were bound and added to the shelves.

"After receiving the report of the judges, Messrs. Charles B. Going and Frederick Hobart, the council awarded the president's gold medal for the best paper submitted by a student member during the year, to Frank G. Wickware, of McGill University, for his thesis entitled 'The British Columbia Copper Company's Mine and Smelter.' The council also awarded three cash prizes of \$25 each as follows: To Frank G. Wickware for the paper mentioned above; to J. J. Robertson, School of Mining, Kingston, for his paper entitled 'Cyanide Tests on Temiskaming Ores'; and to R. P. Cowen, McGill University, for his paper entitled, 'Number Four Pit, Brayton Domain Collieries, Cumberland, England.'"

The ballots for officers were referred to the scrutineers, Messrs. F. Hobart, J. C. Murray and A. R. Wilson being appointed to that position.

At the afternoon session J. M. Clark read a brief paper on "Royalties on Minerals in Ontario." This was followed by a discussion on the mining tax law pending in the Ontario legislature, at the close of which the following resolution was adopted:

"This institute believes that the bill now before the Ontario legislature providing for the taxation of mines is opposed not only to the mining interests, but also to the manufacturing and agricultural interests of the province, and we, as a body, respectfully ask the Ontario Government to take time, and carefully consider what has been the effect of mining legislation in other countries and in this province."

The members of the institute then proceeded to the Parliament Buildings, where the Minister of Mines, Hon. Frank Cochrane, had arranged for hearing a discussion of the bill. President Smith, Messrs. Hardman, Coste, Hay, Leonard and Clark were spokesmen for the delegation.

At the evening session a number of papers were read by title. Three papers were presented in full: "New Tilbury Oilfield in Ontario," by Eugene Coste; "Status of Mining in Canada," by J. C. Gwillim; "Anthracite Coal Mining," by H. H. Stoek. Mr. Coste's paper was accompanied by maps and diagrams. Mr. Gwillim's paper, which referred to the ethics of the mining profession and the relations between engineers and promoters, was discussed at some length.

THE SECOND DAY.

The morning session was chiefly devoted to Cobalt. W. G. Miller, provincial geologist of Ontario, opened with a brief address on recent changes and develop-

ments in the Cobalt district, which was illustrated by maps and geological sections. He was followed by Prof. C. R. Van Hise in a long and interesting paper on the "Ore Deposits of the Cobalt Region," in which he discussed the probable methods in which the ores were deposited. He considered it probable that the cobalt was the result of deposition by underground waters, the silver being a secondary deposit due to descending waters. He gave his reasons for this belief in a very clear way. In conclusion he expressed the belief that other rich deposits might be found in the neighbouring areas. It is impossible to abstract this valuable paper in a brief space. It was followed by a discussion, in which a number of members took part.

In discussing the paper, Eugene Coste said that the Port Arthur district would yet surprise Canadians for silver deposits. It had never been properly explored, and if it were it would show ores of exceptional richness, he thought.

Dr. Robert Bell, of Ottawa, read a technical paper on "The Cobalt Mining District," giving an account of his explorations in regard to mineral areas of the north.

At the afternoon session there was some further discussion on the Ontario tax law, and the following resolution was adopted:

"While freely acknowledging and assenting to the right of the Government to impose such taxation as may be shown to be necessary or expedient for purposes of revenue, yet it is an axiom of justice that all such measures of taxation should be framed only after such consideration and discussion as may insure a minimum of discomfort and of burden to the industry thus taxed. Therefore, be it resolved: That the mining industry has no objection to taxation imposed of necessity and equitably distributed and collected, and provided, further, that such taxation thus imposed shall not attack rights and titles already vested with the sanction of the Crown; that it does object to the principle of a royalty tax, because it is confiscatory in its nature. Properties have been taken up under legislative enactments abolishing royalties in Ontario. It is impossible of collection except by an intolerable system of inquisition, which is imposed on no other business interests in the province. It will undoubtedly act, as did the bill of 1891, to prevent the investment of capital in Ontario.

"In consideration of these facts we hereby request the appointment of a commission to consider the bill along the following lines, namely: The amount of revenue which your Government deems necessary to procure from the mines of the province; a proper and equitable method of collecting such revenue; the effect of such a tax upon the mining industry and upon those interests which depend thereon; the history and effect of similar legislation in the Dominion of Canada; the following methods of raising such revenue, if necessary: A tax on acreage of mining land; a tax upon the capitalization of mining companies; an increased annual licence fee from incorporated mining companies; a tax on dividends de-

clared by mining companies."

P. H. McBennie, Niagara Falls, read a paper prepared by himself and F. A. Fitzgerald on "Magnetic Separation by the Goudal Process," showing that this method was used in Scandinavian countries with success. The crushing, mechanical treatment and other incidents were explained.

Dr. Robert Bell, Ottawa, read a paper on "Sir William Logan and the Geological Survey of Canada," giving a selection of the incidents and anecdotes, reminiscences of the man from all points of view.

Hiram W. Hixon, Victoria Mines, read a paper on "Magnetic Waters," which called out a lively discussion.

THE ANNUAL DINNER.

The annual dinner of the institute, always an important function, was largely attended, and passed off very successfully. Some excellent speeches were made in response to the various toasts. After the usual toasts to the King and the President of the United States, he following were given:

The Dominion and Provincial Governments, responded to by Lieutenant-Governor Clark, of Ontario, Hon. Frank Cochrane, minister of mines, and Hon. W. J. Hanna, provincial secretary.

The Mining Industry; J. E. Hardman, of Montreal, and Prof. J. R. Kemp, of New York.

Sister Societies; Dr. A. R. Ledoux, of New York, for the American Institute of Mining Engineers, R. W. Leonard for the Canadian Society of Civil Engineers, and H. W. Corbett for the Mining Society of Nova Scotia.

The Guests; Prof. C. R. Van Hise, Prof. Chamberlain and Bailey Willis, of the United States Geological Survey.

The Press; Frederick Hobart, of New York, J. C. Murray, of Toronto, and H. H. Stock, of Scranton, Pa.

The Transportation Companies; R. C. Steele, of the Toronto Board of Trade.

Retiring President George R. Smith delivered a brief and appropriate valedictory, and introduced the new president, Frederic Keffer, who responded, also briefly.

THE MORNING SESSION.

At the morning session a paper was given by Dr. William Campbell, of Columbia University, New York, on "Microscopic Examinations of Nickeliferous Pyrrhotite." His address was illustrated by lantern slides.

"The Marble Bay Copper Deposit, Texada Island, B. C.," by O. E. Leroy, of Ottawa, was read.

E. Jacobs, of Victoria, dealt with "Progress of British Columbia Mineral Production." He stated that the dividends declared last year by British Columbia mining companies amounted to between \$3,000,000 and \$4,000,000.

It was announced that the mine taxation bill of Ontario would probably be considerably modified, or that full opportunity would be given to draft a new bill.

At the afternoon session the scrutineers reported the result of the ballots as follows, the gentlemen named being elected for the ensuing year:

President—Frederic Keffer, Greenwood, B. C.

Vice-presidents—Dr. J. Bonsall Porter, Montreal, Quebec; W. G. Miller, Toronto, Ontario; W. Fleet Robertson, Victoria, B. C.

Secretary—H. Mortimer Lamb, Montreal.

Treasurer—J. Stevenson Brown, Montreal.

Council—E. W. Gilman, Montreal; James McEvoy, Fernie, B. C.; Frank B. Smith, Edmonton, Alberta; R. W. Brock, Ottawa, Ont.; J. C. Gwillim, Kingston, Ont.; Dr. F. D. Adams, Montreal; H. E. T. Haultain, Craigmont, Ont.; D. H. Brown, Copper Cliff, Ont.

The following papers were read and briefly discussed: "The Geology of the Franklin District Ore Deposits, B. C.," by R. W. Brock, of Ottawa.

"Some New Points in the Geology of Copper Ores," by Prof. James F. Kemp, New York.

"Iron Possibilities of the Province of Quebec," by F. Cirkel, Montreal.

"History of the Bruce Mines," by H. J. Carnegie Williams, Bruce Mines, Ontario.

A number of papers were read by title. The usual resolutions of thanks, etc., were passed and the meeting finally adjourned.

THE COBALT EXCURSION.

A party of about 70 members of the institute left Toronto at 8:30 p. m. on Friday on a trip to Cobalt, a special train having been furnished by the Grand Trunk and Temiskaming & Northern Ontario lines. This party spent two days in Cobalt, leaving there at 4:30 p. m. on Sunday, March 10, for North Bay, whence the members dispersed to their homes. This closed one of the largest and most successful meetings ever held by the institute.

MINING IN FAIRVIEW CAMP.

Particulars of Operations During Recent Months.

FAIRVIEW CAMP, in Okanagan Valley, which some years since was the scene of much activity,

with a number of gold-quartz properties being worked, still possesses the confidence of shareholders in one company, as indicated in the accompanying notes, reprinted from the *Hedley Gazette*:

The last eight months have seen many additions to the extensive plant of the Stemwinder Gold and Coal Mining Company, Ltd., at Fairview, all tending to such greater efficiency and economy of production and treatment that the management now feel justified in believing the next 12 months will prove the property to be in their own words, "one of the best mines in British Columbia."

During the temporary suspension of work, caused by the fault which cut off the ore body at three places in the mine, the machinery and plant suffered no harm whatever, and the same has, with additions, been put into such shape that work of much magnitude can be successfully coped with.

The old New Fairview Corporation, Ltd., underwent reconstruction and thereby were secured additional working funds to open up the ore under the break referred to (which ore, by the way, is the best the mine has yet shown).

A new flume more than a mile long has been constructed from the waters of Reed Creek to the head of the pipe-line and this will double the water supply available for power and treatment purposes, enabling in the spring and early summer months steam costs to be entirely dispensed with. A large belt-driven cross-compound Rand air compressor has been purchased and installed in the southeast end of the mill, which has been enlarged for its accommodation, adjoining the powerful Corliss engine that will operate it in addition to the 46 stamps when the water supply is short; and a large stock of supplies has been laid in for the contemplated work.



Stemwinder Mill and Other Buildings, Fairview Camp.

Chief among these latter are a couple of the new Murphy drills, which certainly do wonders in the way of perforating rock. With the self-feeding attachment and mounted on a bar the bit is placed where a hole is desired, air turned on, and the drill is "let go" for all it is worth. The way a round is put in is a revelation to those accustomed only to the old style drills. Two rounds a shift is easier than one before, and so successful have these machines been in some preliminary work (a 20-ft. raise 5 ft. square having been completed inside of two days) that another drill has been ordered.

The shaft is being sunk to the 600-ft. level from the bottom of the present 300-ft. incline shaft, all new work being perpendicular. A raise is to be made from the present 600-ft. level which will come out at the back of the mill and give an admirable site for headworks and dump crusher and facilitate the delivery of ore to the bins.

Work on the shaft is now under way, and unless unlooked-for difficulties arise, by cross-cutting the ore each 100 ft. during sinking operations there will become available a large amount of pay ore that will amply demonstrate the value of the property.

QUEEN CHARLOTTE GROUP, NORTHERN BRITISH COLUMBIA.

Official Report on Graham Island.

QUEEN CHARLOTTE ISLANDS, in common with other parts of northern British Columbia, are receiving increasing attention from prospectors for minerals and cruisers for timber. It has long been known that several of the group are mineral-bearing, but owing partly to the general roughness and densely forested character of the country, with its consequent comparative inaccessibility, and partly to the absence of frequent and convenient means of communication with the more populous parts of the Province, there has not been until recently much mining done on a commercial scale.

There have not been many official reports, neither Dominion nor Provincial, of these islands published. Among those available, beside the literature referred to in the following report, are two published by the Bureau of Mines of British Columbia, but these deal with particular localities. In the "Annual Report of the Minister of Mines" for 1901, pp. 999-1003, may be found a report by Mr. H. Carmichael, provincial assayer, on a visit to Ramsay Island and adjacent islands. In the 1902 "Annual Report," pp. 54-58, there was printed a "Report on the Coal and Iron Deposits on Graham Island, one of the Queen Charlotte Group," by Dr. T. Rhymer Marshall, F. C. S., etc. The most recent official information is contained in a "Report on Graham Island, British Columbia," by Dr. R. W. Ells, of the Geological Survey of Canada. This report gives first the information reprinted herewith, and next treats of the general geology of Graham Island and its coal-bearing rocks in particular. Space limitations prevent the publication in this number of the *MINING RECORD* of the full report, so only that part first above-mentioned is reproduced at this time, the present purpose being to place at the disposal of those interested the following observations made by Dr. Ells preliminary to the more technical part of his report:

The group of the Queen Charlotte Islands is situated off the west coast of British Columbia, and extends, roughly speaking, between longitudes 130 deg. 54 min. west, for the south part of Kunguit or Prevost Island, and 133 deg. 9 min. for the northwest part of Graham Island, at Frederiek Island; and in latitude between 51 deg. 53 min. and 54 deg. 15 min. north. It comprises a number of islands of which the principal, from south to north, are Prevost, Moresby, Graham and North, while, on the east coast of Moresby, are several others of considerable size, such as Burnaby, Lyell, Louise, etc.

A report was written in 1878 on the geological features of the group, by Dr. G. M. Dawson, with which was incorporated much information relative to the natural history, the Indians and other matters of general interest. Examinations were carried out by means of a small schooner, and were almost en-

tirely confined to the eastern shores of the several islands, through a trip of one mile to the entrance of Graham Island, following the waters of Masset Inlet from the north end.

The portion to which the present report chiefly refers is the most northerly, comprising Graham Island, the largest of the group, and North Island, at its northwest angle, these two forming the most northwesterly portion of the Pacific seaboard of the Dominion of Canada. These islands lie between longitude 131 deg. 36 min. (that of Rose spit, the northeast point of Graham Island) and 133 deg. 9 min. (that of Frederiek Island, on the west coast), and in latitude between 53 deg. 8 min. and 54 deg. 15 min.

The only two settlements on Graham Island are the Indian villages of Skidegate, at the southeast extremity, and of Masset, at the north end. The nearest shipping ports on the mainland of British Columbia are Ports Simpson and Essington, the distance from Masset to the former in a straight line being 85 to 90 miles and from Skidegate to Simpson 115 miles, or to Essington 115 miles. The sailing distances are of course somewhat greater than those given. The nearest land on the north is at Point Chacon in Alaska, distant about 45 miles.

Connection with the mainland is made by means of a steamer calling at Skidegate once a month and at Masset once a year, though a less infrequent service to the latter place is contemplated. At other times communication is had with the ports in British Columbia by sailing boats of about five tons burden, known as "Columbia River boats," which usually have fine sea-going qualities.

Graham Island is much broader at the north end than at the south. Thus, from Rose Point, on the northeast, to Cape Knox, at the northwest extremity, is 53 miles in a direct line; while from Lawn Hill, near the southeast point, to the south entrance of Rennell Sound, on the southwest coast, is only 25 miles across country. This is also practically the distance between Skidegate Village and Hunter Point, at the northwest entrance to Cartwright Sound. The distance between Masset Village on the north and Skidegate on the south is about 48 miles measured directly across the island, while from the north end of North Island to the western entrance of Skidegate Channel along the west coast is about 77 miles. The area of the island, roughly speaking, is somewhat more than 2,000 sq. miles.

The northern interior of the island is accessible by water through Masset Inlet, a deep and narrow tidal water-way, which, after a distance of 17 miles, expands into a large lake-like sheet of water, with a length, from east to west, of 18 miles, and a breadth north from the mouth of Yakoun River, which is near the southeast angle, of about seven miles. On the south side of this inland lake a narrow passage, through which the tide rushes with great force, connects with another inland salt water lake known as Tsooskatli, which is nine miles long, one to two and a half miles wide, and contains many small islands.

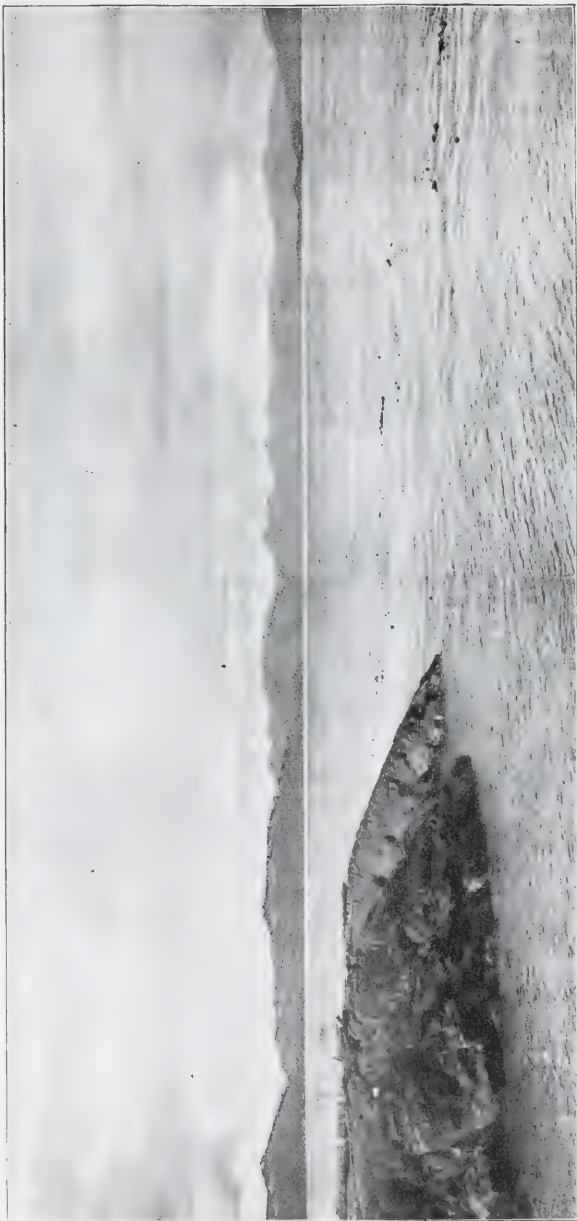
The time of high water in this inland lake is about four hours and a half later than at Masset harbour.

To the north of the main expansion of Masset Inlet there is a fresh water lake about 14 miles long from east to west, with a maximum breadth of one mile and a half, known as Iintsua Lake, which connects with the inlet by the Ain River. All these inland lakes are bordered by high ranges of mountains, including many cone-shaped peaks. All are composed of igneous rocks, portions of which are Pre-Cretaceous, and part of later Tertiary age. By the Iintsua Lake a water-way extends nearly across this part of the island, west of Masset Inlet, a ridge of scarcely more than a mile in width separating it from the waters of the Pacific Ocean in Kiokathli Inlet, on the west coast of the island.

The island affords but few good harbours. On the west coast, the only really good seaport, which however, has never been surveyed by the Admiralty, is near the southern end and is known as Rennell Sound. It has a broad, clear entrance from the sea and extends inland about eight to nine miles, curving, towards the north half, to the southward and thus forming excellent shelter from westerly gales. It can be readily recognized along the shore by the presence, at its entrance, of a hill, which rises somewhat abruptly from the beach on the east side to an elevation of 1,000 ft. The inner end of this sound contains several small lakes, one of which was named Shields by Mr. W. A. Robertson, the original discoverer of the Gr. C. coal areas; from one of these islands a trail was constructed eastward for about four miles to the shores of Yakoun Lake. This lake is at the head of the Yakoun River, and is on the line of contact between the coal measure rocks of the west half of the island and the igneous rocks of the west coast. The trail passes over a ridge about 600 ft. high or 390 ft. above the surface of the lake, as measured by aneroid.

Kano Inlet, sometimes called Cartwright Sound, which is a few miles south of Rennell Sound, extends

inland for about seven miles. At its entrance the width from point to point is about three miles, and



Queen Charlotte Islands — Looking West from Ramsay Island.

three miles inland, narrows to two miles. There is a cove on the south shore with a small island where good shelter can be obtained for fishing boats, though

the inlet, seaward, presents no other shelter from westerly gales. During the past season a fishing station for halibut was established here by Capt. Bradford. The inner half of the inlet is more narrow and terminates in two small coves, that to the southeast being bordered by high-peaked mountains which reach elevations of 3,000 to 4,000 ft., the summits, in July, being covered with snow. At the northeast angle of this inlet, the shores are lower, and a small creek enters from the east.

To the north of Rennell Sound the inlets are small. The shores are uniformly rough, often with ragged ledges, and good beaches are rarely seen. Several small islets are found near the entrance of the smaller indentations. The largest of these inlets, known as Kiokathli, is about 25 miles north of Rennell Sound, but the entrance is bad and there are ledges inside which make it dangerous for vessels in its present unsurveyed state. Good anchorage for boats can be had in the sheltered coves, but care must be exercised, owing to sunken rocks.

There are three principal islands on the west coast, the most southerly being Marble Island, in the western entrance to Skidegate Channel. Of the other two, the more southerly is known on the charts as Nesta or Hippo Island and is about 18 miles north-west of Rennell Sound; the other, Frederick Island, is 26 miles further north, or 14 miles south of Cape Knox, which forms the northwest angle of Graham Island. Hippo Island has a length from east to west of about two miles, is high nearest the shore and slopes gradually to the west end. Shelter for small vessels can be found in the small bay on the east. Frederick Island is somewhat similar in shape and size but the shelter is not so good.

The southern channel, between Graham and Moresby Islands, is open to the sea on the west, with practically no shelter except Marble Island. On the north side of this channel, known originally as Cartwright Sound, are two bays; the outer one, due north from Marble Island, extends inland for a mile or more; the other, near the entrance to the channel proper, is known as Dawson Inlet and divides into two arms that extend inland for two to three miles.

The point north of Cartwright Sound or the western entrance of Skidegate Channel is very rough with jagged ledges and reefs stretching to the south-west for several miles. On Vancouver's plan, this is known as Hunter's Point, but on Dawson's map this name is changed to Buck Point, which is the name given by Vancouver to the northwest corner of Moresby Island. The channel round the large island at the western entrance to Skidegate Channel is partially dry, except at high tide, when it can be traversed by small boats only. Eastward of this island, Skidegate Channel is also navigable for small boats only, and by these only at high water, owing to shallows and heavy tidal currents at what is known as the East and West Narrows. The shores are rocky and bordered by high hills throughout the whole distance.

The eastern part of this channel opens out into

South Bay, and thence it gradually widens into Skidegate Harbour, at the southeast corner of the island. This is practically the only harbour on the south and east coasts of Graham Island or along the north shore till Masset is reached.

The western part of Skidegate Harbour contains a number of islands, some of which are of considerable size, including Maude, South, Lena, etc. Around the head or western end of the harbour, near Cowgitz, the land is high, rising on the north into mountains 3,000 to 4,000 ft. above the sea. On the Moresby Island side, adjacent to the south, similar high peaks are seen, some of which are apparently perpetually snow capped.

The only harbours along the east coast east of Skidegate Village are three shelters, for small boats only, at the mouths of small streams and accessible only at high state of the tide. At low water they are entirely dry. These are at the mouth of Tillal River about 25 miles north of Skidegate; at a small creek south of Cape Ball; and at a small lagoon near Cape Fife, about eight miles south of Rose Point. Inside the bends of the creeks at these places boats can lie safely sheltered from east winds, but are aground at low water. On the north side a similar high-water shelter for boats is found in Hiclan Creek at Tow Hill, ten miles west of Rose Point. In bad weather, therefore, boat navigation along this coast is very dangerous and many lives have been lost in the vain attempt to reach a shelter in some one of these small harbours.

Along the north shore, Masset and Virago Sound are the only harbours of consequence. The entrance to the former is somewhat obstructed by a bar on which the water has a reported depth at low tide of three fathoms, but the position of this bar is not fixed, owing to heavy storms and tidal currents. In the inlet, good water extends all the way to the lake expansion though there are heavy tidal currents throughout the entire seventeen miles of the narrow approach.

At Virago Sound, about 12 miles west, the entrance is somewhat narrow but there is plenty of water, and once inside the points there is a perfect shelter and good anchorage.

These shores are practically uncharted except in the vicinity of Skidegate and, to some extent, at Masset, and the charts of the west coast are useless for navigation. No soundings have been taken, the coast line is merely sketched in, and is fringed in places for some miles seaward by jagged reefs, on which the seas are constantly breaking in rough weather. No reliable information could be obtained as to the character of this shore except that it was very rough, and no one could be found at the time of our visit who could act as pilot or who knew very much about this portion of the island.

The shores of the North Island also are without soundings, and the coast line is merely sketched in on the east side, near the entrance to Parry Passage, which separates this island from Graham Island.

About nine miles farther east there is a good high-water boat harbour at the mouth of the Jalun River.

In the absence of a pilot, or of definite information as to the features of the west coast, we had to depend upon our own resources, aided by a rough sketch of the Crown land plan of the island. The one man, apparently, who had been around the shores with Dr. Newcombe, of Victoria, some years before, had gone with the rest of his tribe to the mainland for the salmon fishing.

The whole island is densely wooded down to the sea-beach. There are no roads or cleared areas in any part and the only trails are those from the shore of Skidegate Harbour inland to the coal areas at Camps Robertson and Wilson, the first eight miles in length, and the second about the same distance farther north. The Robertson trail has been carried west to the shore of Yakoun Lake about three miles distant. A horse trail is now being made between Skidegate post office and the ranch at the mouth of Tllal River about 25 miles north. Communication between Masset and Skidegate settlements is made either by traversing the beach, a distance of more than 100 miles, or by sail-boat round by Rose Spit. A few horses are kept at Masset by Indians and by Rev. Charles Harrison, who has a small ranch called Delkatla three miles east of the Indian village, while a Mr. Hodge at the Tllal has a few head of cattle and horses and a fine piece of natural ranch-land. These animals pick up a living on the wild grasses along the borders of the beaches or in glades in the woods, while on the ranch lands at Masset and Tllal considerable quantities of hay are made from the wild grass on the marsh lands along the creeks. A number of fine cows are also kept at these places and the Indians, both at Masset and Skidegate, own a quantity of cattle which run practically wild in the woods for a good part of the year.

In the northeast part of the island, towards Rose Point and in rear of Cape Fife, there is also a considerable herd of wild cattle. These are being hunted down for the sake of the meat, which is taken to Port Simpson or to one of the Alaskan ports for sale. The herd was reported as very large, but from close inquiries, it appears that the number of animals at present in this part of the island in a wild state is probably less than 100.

The forest being generally dense, ranching can only be carried on, with any chance of success, at widely separated points. With the exception of the above-named, no other attempts have yet been made at ranching on Graham Island, though on the adjacent island, (Moresby) at Spit Point across from Skidegate, a ranch of large size has quite recently been started under favourable conditions. Owing to the fact that severe winter weather never visits these islands, the stock can be kept in the open all the year round.

The islands of the Queen Charlotte group held, some 30 years ago, a large Indian population, variously stated at from 5,000 to 7,000 persons (Haidas), who were scattered in villages along the

entire coast line. They have gradually decreased—through sickness or removal—and the number of persons in this group is now reported to be about 700. Gradually, also, the entire Indian population has removed from the once widely-separated villages, the remains of which can still be seen at many places, until they are all now concentrated at the village of Masset at the north end of Graham Island, and at Skidegate at the south end. At both places the Indians are comfortably situated, having good houses and boats, a co-operative store and a factory for the manufacture of dog-fish oil under their own control and management (the last-named two industries being located at Skidegate), while there is another factory, usually known as the oil works, located at Skidegate post office, two miles west of the Indian village, where employment can also be obtained, if desired. In point of comfort and physical well-being, the Indians of this island appear to be fortunate. They are also musical and there is a good brass band, entirely managed by themselves, in each village. During the summer months—from the middle of June to the middle or end of August—the island is practically deserted by the Indians, the whole population migrating to the mainland of British Columbia, where they are employed in the numerous salmon canneries along the coast from Portland Canal south to Fraser River. In ordinary seasons, the earnings for this time are sufficient for the family's comfort and support for the rest of the year, so that, with the exception of providing what few fish are required for home consumption, there appears to be but small incentive for hard physical work.

During the winter months certain members of the tribe engage in hunting, principally the bear, which appeared to be quite numerous, especially in the country around Yakoun River and lake, and in the southern half of the island. Of other large animals there appears to be a scarcity, though Rev. Charles Harrison of Masset asserts that caribou have been found in the country adjacent to Virago Sound. As few white persons have ever attempted to penetrate the dense forest of the interior the presence of this animal might easily escape notice. During our boat journey along the north shore, west of Virago Sound, several forms, like deer, were observed feeding along the beach. It was supposed at the time that these might be wild cattle, but as the herd of these is, so far as known, confined to the area east of Masset Inlet, and as no trace of them has been reported from this part of the island, it is quite possible that the animals seen may have been deer. Our boat was, at the time, too far from the land to definitely determine this point.

The forest growth is remarkable in several ways. Apart from its dense character, the trees are often very large, reaching, in some cases, a circumference of thirty feet, with a height of 250 to 300 ft. According to Bull. No. 21 (U. S. Dept. of Agriculture, Washington), "North American Fauna, 1901," Os-good, the principal species of trees which occur in

the island are the Sitka spruce (*Picea sitchensis*), the Western hemlock (*Tsuga heterophylla*), the alpine hemlock (*Tsuga mertensiana*), the Giant cedar (*Thuja plantata*), the yellow cedar (*Chamaecyparis nootkatensis*), the northwest coast pine (*Pinus contorta*) and the Pacific yew (*Taxus brevifolia*). In addition to these, the alder (*Alnus oregonia*) grows to a large size, often having a diameter of from 12 to 20 in., or even larger; the willow (*Salix scouleriana*), is often of fair size, and the Oregon crab-apple (*Pyrus rivularis*), grows along some of the inland streams and on the beaches, and forms a great impediment to travel, owing to its spiky or thorny character.

Among berries, the most abundant seen by us were the sallal (*Gaultheria shallon*), salmon berry (*Rubus spectabilis*), especially plentiful and laden with large yellow and red berries, elderberry (*Sambucus racemosa*), dogwood (*Cornus occidentalis*), honeysuckle (*Lonicera involucrata*), and wild currant (*Ribes*). Throughout the forest progress is greatly impeded by thickets of sallals and salmon berry, a thick growth of the devil's club (*Echinopanax horridum*), and large quantities of the rank skunk cabbage (*Lysichiton kamschatcense*), the fleshy succulent roots of which are a favourite food of the bears; the leaves sometimes measure 3 ft. in length by 18 in. in breadth. The great amount of moisture which prevails for a large part of the year develops an abundant undergrowth of shrubs and ferns, that often occur in great clustering bunches and are almost impossible to penetrate. Through many centuries of decay numbers of huge trees have become imbedded in the soil which is probably largely composed of decayed vegetation; the usually very rough ground surface is often covered with large prostrate tree-trunks from 5 to 8 ft. in diameter, which lie in all directions and are thus practically impassable. Upon these fallen trunks, numerous examples of wonderful forest growth are seen in the presence of large cedars or other trees which grow entirely from the upper surface of the fallen timber, the huge roots of the latter growth clasping the trunk beneath. The newer tree sometimes has a diameter of 4 to 6 ft. and a height of 200 ft.; the prostrate log, when cut into, is in many cases, apparently quite sound in spite of the long interval that must have elapsed during the growth of the newer tree.

The whole of the island west of Masset Inlet in the northern half, and a line drawn through the valley of the Yakoun River and Lake and thence to the shore of Skidegate Harbour east of Slate Chuck Creek, is occupied by igneous rocks, and is exceedingly rough, with many mountains, the peaks of which rise to elevations of 2,000 to 5,000 ft. above the sea. Some of these are cone-shaped and snow can be seen in their summits for the greater part of the year. These hills are all densely wooded, except where occasional patches of heath appear along the sides on their upper portions. It may be imagined that the whole of the country in this direction is exceedingly hard to traverse or to prospect.

East of the line referred to through the centre of the island the surface is comparatively low, and over large portions quite level. Forest fires have destroyed much of the original timber growth, more especially throughout the eastern part, but the second growth is dense everywhere. There are no tracts of clear land, but extensive swamps are found. Several comparatively low ridges are seen in the northeast corner of the island which extend southerly from Tow Hill and in rear of Cape Fife, and these may represent masses of igneous rocks of which however no definite statement can be made owing to the absence of outcrops in that area; but masses of basaltic rock of the later Tertiary age, in places columnar in character, are found at Tow Hill on the north and at Lavn Hill on the southeast coast. To the north of Skidegate high ridges are seen, which, according to the chart, reach a height of 1,400 ft. These are in part igneous and in part a conglomerate.

The exposed rocks of this eastern area are generally sandstone and shale of Cretaceous and Tertiary age. Rock outcrops are seldom seen except on a few of the streams in the southern part of the island, while merely surface exposures are rarely visible owing to the thickness of the soil covering. Some of the streams cut deep channels, but the banks are usually of sand and gravel with occasional thick beds of clay. These streams are difficult to traverse owing to the quantity of drift tree trunks and the abundance of boulders, which make walking very dangerous. In the Yakoun River the drift trees render the stream impassable for long distances and in places entirely choke up the channel.

The literature relating to the island may be briefly stated. It has been reviewed by Dr. J. F. Whiteaves in his "Report on Mesozoic Fossils, 1876," and later by Dr. G. M. Dawson in the Geological Survey "Report of Progress, 1878-79," pp. 8 to 14. It extends from the expedition under Juan Perez in 1774 down to Pender's survey of Skidegate Inlet in the "Hecate" in 1866. On the part of the Geological Survey, Mr. James Richardson, in 1872, paid a visit to the south side of Graham Island, and examined the deposit of anthracite at the west end of Skidegate Harbour, known as the Cowgitz mine, the report on which is contained in the volume for 1872-73. In 1878, Dr. G. M. Dawson, in the small schooner "Wanderer" of 20 tons, examined the eastern shores of the several islands in the group as far as North Island, and also the inland waters of Masset Inlet. The western shores were not, however, visited on this trip. The report on this expedition will be found in the annual volume above-mentioned.

Various papers relating to the archaeology and natural history of the islands have appeared from time to time between the years 1868 and 1901. Among the excursions undertaken for this purpose Dr. C. F. Newcombe made two voyages in 1895 and 1897, respectively, with reference principally to archaeological researches among the Haida Indians. Collections of fossils were made from a number of places, and these have helped to more definitely settle

the age of the sedimentary rocks of Graham Island, though collections had previously been made by Mr. Richardson and by Dr. Dawson. These collections are all from points along the shores.

The interior of the island was, however, almost entirely unexplored, the only information relative to it being obtained from the brief trip of Dr. Dawson in 1878. In 1885 Mr. W. A. Robertson of Victoria, while making an exploration on behalf of the Provincial Government in connection with the timber resources of the island, ascended the Yakoun River to the lake at its head. Thence, crossing the country he reached the harbour of Skidegate at the mouth of the Honna River. In this trip, while examining some of the small streams to the east of the Yakoun, pieces of bituminous coal of excellent quality were observed, and on tracing these upward to their source a seam of large size was discovered which was afterward opened up to some extent along the outcrop and is known as the "Wilson seam." Farther to the south drift coal was also seen on the east branch of the Yakoun which flows into the main stream a short distance below its exit from the north end of the lake. Tracing these pieces to their source, another large and valuable deposit was disclosed, situated about three miles east of Yakoun Lake and some eight miles inland from the mouth of the Honna. This outcrop was subsequently styled the Robertson seam—after its discoverer. This seam has also been opened up along the outcrop for a short distance, under the direction of several mining engineers who have visited the locality at different times in the interest of the owners.

Owing to the desirability of ascertaining something definite, if possible, as to the structure of this coal field, it was decided early in 1905, by the acting director of the Geological Survey of Canada, to send a party to Graham Island for that purpose. In the carrying out of this work an examination was made of the interior as far as was possible, and of the entire shore line, starting with Skidegate and going west through the boat channel which separates Graham from Moresby Islands, and thence by the west coast to the north end of North Island. From this point the north shore was examined, including the harbour of Virago Sound where lignite had been reported as occurring. A trip was taken inland to the heads of the several lake expansions. At Masset Inlet the party divided. My assistant, with one man, ascended Yakoun River to the lake, partly by small canoe and partly on foot through the woods, whence they followed the trail to Robertson Camp and thence out to Skidegate by way of the Honna trail. This was a very difficult trip, owing to the low state of the water in the river, and the number and extent of the log-jams which compelled them to abandon the canoe before the lake was reached.

Returning with the boat to the mouth of the inlet the coast was followed to Rose Point, where much difficulty was experienced in rounding Rose Spit and where one boat was lost owing to heavy seas. A gale from the west also detained the party for 10 days at

Tow Hill. Thence the shore was followed south to Skidegate.

The journey around the coast was made by means of a Columbia River fishing-boat having a length of 25 ft. over all, by 7 ft. beam. These boats are fitted with centre-boards and carry a mainsail and jib. They are usually very seaworthy and are fairly easily handled in calm weather, being arranged for four oars. The carrying capacity is about five tons.

This plan of exploration, the best that could be had at that time, is far from satisfactory on a coast like that of British Columbia, abounding in deep fiords, strong tidal currents, and subject to long intervals of calm weather, alternating with heavy gales. The necessity of seeking a safe shelter every night, especially along an uncharted coast, without a pilot familiar with the shores, involved a certain amount of anxiety, especially when on the west and north coast, where the danger from heavy westerly or northerly gales is great, owing to the scarcity of sheltered coves or harbours. For this kind of exploration, a good staunch gasoline or steam launch is almost necessary, would obviate many exasperating delays, and, on the whole, would be more economical—to say nothing of the more important element of safety—than the ordinary sailing craft.

The rivers on the islands are few and, generally, of small size. The Yakoun is the largest, connecting Yakoun Lake in the southwest part of the island with the head of Masset Inlet. This river has a length of about 18 miles in a direct line, though, with the windings in its course, the actual length is probably not far from 25 miles. It flows, largely, through banks of sand or clay for the lower half of its course, but several rock ledges outcrop in the upper portion. No detailed survey of this stream had ever been made and but little information could be obtained as to its character, beyond the fact that in spite of considerable obstruction in the channel, due to drift logs, it had been ascended, at certain stages of water, in small canoes. A compass survey was made by my assistant during the latter part of July, the distances being determined by pacing where possible or by estimation where pacing was impracticable. The water was very low, and the canoe could not be taken to the lake, but the several log-jams were located, and measured, and the positions of the shallows were fixed. The log-jams in the river are more than 30 in number, some of large dimensions.

The first jams were found about two miles from the mouth of the stream and, in the next stretch of two miles, ten jams were located, including several logs with diameters of from 12 to 30 in. The next three miles were comparatively free from logs, but the stream was shallow, with banks of clay and sand. Jams are frequent in the next three miles, 10 being seen, several of which were marked as "bad," with drift logs up to 60 in. in diameter. In the next six miles, up stream, these jams are comparatively rare; occasional ledges of sandstone outcrop, cutting in places directly across the river. In the next stretch of three miles there are 10 log-jams, several of which

are very bad, to within about four miles of the foot of the lake where it was found necessary to leave the canoe, the last distance to the lake being almost clear, with the exception of one large jam. For a couple of miles there is dead water below the outlet. At about six miles below the lake, the stream flows through a channel cut in the sandstone for a distance of about half a mile, the passage being from 12 to 20 ft. in width.

Many of these jams are old and solid, the lower trees being partially buried in the sand. At a high stage of water some of them would be covered sufficiently to pass boats of 2 to 3 ft. draught, but the greater part would have to be removed to obtain a passage for small boats from salt water to the lake. They could, however, quite readily be removed by proper appliances, when the water in the river is high by means of a small steam engine, a tug or steam scow and dynamite for the large logs. Besides the log-jams, the number of shallows in the stream would seriously interfere with navigation except in high water stages.

Owing to the generally low condition of the banks and the almost impenetrable tangle of roots, small bush and rank vegetation, it is almost impossible to traverse this part of the country during the summer months, the water in time of flood being dammed back and spreading through the surrounding flat country in small and swampy channels, which in time also become choked with drift wood and form an impassable jungle.

The importance of this stream as a means of inland communication is, however, very considerable. In any attempt to work the coal seams, especially at the Wilson camp, the facilities of transport by this route—if it could be rendered navigable—would be much greater than by trails cut from Skidegate, a distance of 17 miles. With the jams removed and the shallows dredged at the worst points it would be possible to take up light-draught stern-wheel boats or scows as far as the mouth of Wilson Creek, which is only one mile from the outcrop of the coal; or to the lake itself, where the east branch of the Yakoun comes in and where boring operations should be carried on in the valley of this stream to the north of the Robertson camp outcrops. In this way, also, machinery for sawmills which will be necessary for mining operations, can be placed on the ground in the vicinity of both camps with comparative ease.

The mining investment business is in better shape today than it has been in years. Listed stocks are the most attractive to investors, but the straight investments put out by honest promoters continue to appeal to the more conservative investors. What the public wants is stock that can be sold as well as bought. The investment business in mining may be said to be going through an educational period which will result in much good for the industry. Mining is the greatest business in the world, and the honest promoters are educating the investing public up to this fact.—*Bonds and Mortgages.*

COAL MINE OPERATORS AND MINERS MEET IN JOINT CONFERENCE.

Unsuccessful Endeavour to Establish Uniform Conditions at Crow's Nest Pass and Alberta Collieries.

THE COAL MINES of the Crow's Nest Pass and Western Alberta will become a mine for an indefinite period unless an agreement be reached between the operators and their employees, has arrived at. Early in March the first of a series of meetings was held at Calgary, Alberta, and there after until the close of the month the differences between the two parties were very fully discussed with the object of coming to a settlement. Unfortunately, the protracted conference ended without the hoped-for result of a mutually satisfactory understanding having been reached, so that there does not now seem to be a favourable prospect of the production of coal and coke being regularly maintained until after such time as a solution of existing difficulties shall have been found.

The opening meeting was held on March 4. Mr. G. G. S. Lindsey, general manager of the Crow's Nest Pass Coal Company and president of the Western Coal Operators' Association, was chosen as permanent chairman of the conference. After the chairman's opening address a committee on credentials was selected. The report of this committee showed that the operators present were: G. G. S. Lindsey, R. G. Drinnan, A. C. Flumerfelt, H. N. Galer, S. M. Moore, G. L. Fraser, O. E. S. White-side, J. A. Breckenridge, W. F. McNeill, W. H. Aldridge, and L. Stockett. The miners' delegates present were: Thos. Briggs, James Lancaster, John Lorensen, James Douglas, Charles Brooks, W. Graham, James Chapman, A. McLeod, C. Stubbs, H. Evans, A. Granger, O. Barber and H. Morgan.

Several officers of the U. M. W. of A. district board were also in attendance.

Rules and regulations were decided on to govern the meetings and then the scale committee was chosen for the operators as follows: Pacific Coal Company, L. Stockett, alternative, W. H. Aldridge; H. W. McNeill Coal Company, W. F. McNeill, alternative, W. F. Little; Breckenridge-Lund Coal and Coke Company, John Breckenridge, no alternative; West Canadian Collieries, O. E. S. White-side; International Coal and Coke Company, H. N. Galer, alternative, A. C. Flumerfelt; Canadian-American Coal and Coke Company, S. M. Moore, alternative, G. L. Fraser; Crow's Nest Pass Coal Company, G. G. S. Lindsey, alternative, R. G. Drinnan.

The miners on the committee were: Thomas Briggs, Fernie; J. Lorensen, Michel; J. Chapman, Frank; C. Brooks, Coleman; H. Evans, Lundbrook; O. Barber, Bankhead; G. Granger, Cammore; C. Stubbs, Bellevue; A. McLeod, Lille.

The result of the conference, as already stated, was that no arrangement was finally made. The

views of the operators and miners, respectively, as expressed for publication, are given below:

THE POSITION OF THE OPERATORS.

The position of the Operators' Association was stated by President G. G. S. Lindsey as follows:

"I regret that after so much time has been devoted to this matter it should prove to have been thrown away. I regret, too, that the miners could not adhere to what they had agreed to. The miners agreed to leave the whole matter to a committee of four of their number, namely, President Sherman, Vice-President Galvin, and John McDonald and International Board Member Patterson, undertaking to endorse all that they did. This committee consisting of the officers of the district union, agreed with the operators, but went back to the miners' delegates and asked them to reject the agreement arrived at, but in many respects to my mind the result is desirable. In a competitive field, working under different laws in two provinces, there have grown up necessarily many inequalities, and the fair way to deal with such a situation is to endeavour to make conditions and wage scales uniform; this necessarily means some decreases and some adjustments. Mr. Sherman was very strongly of the opinion this was not the time when uniformity could be arrived at, because his men would not consider decreases. Personally I was guided by his statement as to that and was willing that some arrangement in the nature of a *modus vivendi* should be come to for a year. As we progressed the inequalities of the position became daily more pronounced; still an agreement was come to, but it is perhaps, after all, better things should be thoroughly harmonized now. To do this, as Mr. Sherman said, would be impossible on his side at the present time. Outsiders viewing the position dispassionately may do it.

"The Dominion Government has just passed an act constituting a board of conciliation before which such questions and difficulties as the present can be taken and disposed of, and it is there that these matters will probably go. The decision of the board is not binding unless the parties agree, but their quasi-judicial determination would be hard to disregard and probably neither side would wish to do so. Pending such inquiry and decision things remain as they are, neither side can take the advantage and there is no reason to think either side will not abide by the law."

THE MINERS' POSITION.

The miners' side of the case is given in a statement issued by President Sherman, as follows:

"The joint convention adjourned because the miners' delegates unanimously refused to instruct their officers to accept the final offer of the Western Coal Operators' Association, on the ground that the proposed contract sought to bind them to certain conditions, harsher in their nature than any agreements now in existence under the United Mine Workers of America. The hours of labour in the Crow's Nest mines of Alberta were to be increased in some cases,

the increase of wages offered only applied to drivers and others engaged in the transportation of coal underground in Alberta. We were refused an eight-hour day, bank to bank, as in British Columbia. We were offered no increase in wages for contract miners and day men underground. The underground men who would benefit by the slight increase would be but 10 per cent. of the number employed.

"The wages of some men would be decreased under the proposed agreement. The general advance offered on all outside rates was 25 cents per day for men receiving at present \$2 for 10 hours, which would still leave them less than common labourers now receive in the Northwest. Five per cent. was offered on all other outside rates excepting boys. Coke-oven men were to get no increase on contract rates. The special committee did not agree to agree to everything the operators proposed, it being distinctly understood that the delegates had the right to reject any and every clause of the proposed agreement.

"With regard to the discrimination clause, it never protected the miners and was seldom observed by the operators, many of our men being victimized and refused employment. The operators want this clause because they want to encourage and protect men who desire to fight out union while benefiting by the better conditions and higher wages obtained by organized labour."

MINERS GIVE OPERATORS 30 DAYS' NOTICE.

The following notice signed by Messrs. Sherman, Patterson and McDonald, officers of the district board, U. M. W. of A., and all delegates of the miners attending the recent conference, was afterwards handed to W. F. Little, as secretary of the Operators' Association:

'To the Western Coal Operators' Association, comprising the Crow's Nest Pass Coal Company, the International Coal and Coke Company, the West Canadian Collieries, Limited, the Canadian-American Coal and Coke Company, the Breckenridge-Lund Coal and Coke Company, the H. W. McNeill Coal Company and the Pacific Coal Company, Ltd.:

"We, the undersigned, acting on behalf of your employees, hereby give you 30 days' notice that a change of wages, hours and conditions of labour is demanded by your employees at the various mines, coke ovens and outside plants owned and controlled by your respective companies."

THE COAL MINE OPERATORS' PROPOSED AGREEMENT.

After the conference had adjourned *sine die*, the *Fernie Free Press* published the operators' proposition in full, as follows:

ARTICLE 1.—INTERPRETATION.

It is hereby agreed between the undersigned companies, hereinafter called "the companies" on the one hand, and their respective employees as represented by the United Mine Workers of America, District No. 18, hereinafter called "the men" on the other hand, that the following scale of prices and the following terms and conditions shall be in effect and govern the parties for _____ years, commencing April

1. 1907, it being understood and agreed that the parties thereto will meet in conference 60 days prior to the expiration of the agreement and discuss the renewal thereof. This agreement shall cover all the mines, coke ovens and outside plant operated by the companies.

2.—ADJUSTMENT OF DISPUTES.

(a) Wherever it is made to appear that a member or members of the United Mine Workers of America has or have not been fairly treated, or that any dispute or grievance has arisen under this agreement, whether the dispute or grievance is preferred at the instance of the company or any member or members of the United Mine Workers of America, or the men as a whole, then the company will, through its official, meet the proper officials appointed by the United Mine Workers of America and endeavour to settle the matter as hereafter provided.

(b) In case of any local trouble arising in any mine through failure to agree between the pit boss, or mine labourer, or mine labourers, the pit committee and the pit boss are empowered to adjust it.

(c) Before any grievance or dispute shall be submitted to the pit committee the person or persons aggrieved shall endeavour by personal application to the pit boss to settle the matter.

(d) The pit committee in the discharge of its duties shall, under no circumstance, go around the mine for any cause whatever unless called upon by the pit boss or by a miner or miners, or company man or men who may have a grievance that he or they has or have first tried to and cannot settle with the boss or foreman. Members of the pit committee employed as day men shall not leave their places of duty during the working hours except by permission of the pit boss. The duties of the pit committee shall be confined to the adjustment of disputes between the pit boss or other foreman and any member of the United Mine Workers of America working in and around the mines, arising out of this agreement, the pit boss or other foreman and said miner or miners, or labourer or labourers having failed to agree.

(e) In the event of the failure of the pit committee and the pit boss to settle any dispute properly referred to them, and in that event only except in the event of any other dispute arising under this agreement, or grievance preferred by either the company or the United Mine Workers of America, or the men as a whole, the matter in dispute shall be reduced to writing and referred to the superintendent or mine manager, and the local president of the union for their settlement, and should they fail to agree it shall be referred to the president or general manager of the company and the national president of the United Mine Workers of America or his representative, but the local national board member shall be excluded from being the representative of the president.

(f) In all the cases heretofore, under this section referred to, the miners, mine labourers and other parties, involved must continue at work pending the said investigation, adjustments and arbitration, and until a final decision or award has been reached in

the manner heretofore set out. If a miner or miners, or mine labourer or labourers has or have been discharged by the company, he or they shall not remain in the employ of the company while his or their case is being investigated and adjusted as aforesaid.

(g) Any breach of this agreement by any of the parties hereto is not to void the said agreement, but the same is to continue in full force and effect.

The companies signing this agreement shall at any above-mentioned methods of settlement, concede that strikes, lockouts and boycotts shall be absolutely abrogated, and that this agreement is made on the distinct understanding that no strike, lockout or boycott against any individual member of the union as a body, or as against any individual, or as against the companies signing this agreement shall at any time occur or be permitted.

3.—NON-DISCRIMINATION.

No person shall be refused employment or in any way discriminated against on account of membership or non-membership in any labour organization, and there shall be no discrimination against or interference with any employee who is not a member of any labour organization by members of such organization.

4.—SPECIAL RULES, ETC.

The right to hire and discharge, the management of the mine and the direction of the working forces are vested exclusively in the company, and the United Mine Workers of America shall not abridge this right. It is understood and agreed that this agreement shall not conflict in any way with the special rules of the company now in force, provided that the special rules shall not interfere with the rates of wages, or the work to be performed under this agreement.

5.—HOURS OF WORK.

All mine and inside labourers shall work eight hours per day, it being distinctly understood that this means eight hours work at their working place, exclusive of one-half hour for lunch, with the exception of miners working by contract, who are to work eight hours at their working place, outside men to work ten hours except where otherwise provided by the scale. The company has the right to put inside men on at such hours as may be required to keep the breaker or tipples running to full ten hours, and if any day man is required to work overtime, it is agreed that he will do so, the company paying him overtime for the same. Locomotive engineers, motormen, switchmen and others whose duties are both inside and outside the mine, shall be considered as outside employees and work ten hours per day, but in the case of locomotive engineers, motormen and switchmen, they are paid an increased compensation for the same, provided, however, that the foregoing provisions are subject to and modified in British Columbia by the existing laws of that Province.

To prevent men from absenting themselves from work without proper cause, no employee shall absent

himself from his work unless through sickness or by first having previously arranged with the pit boss or his foreman and obtained his consent. If any employee absents himself from work without proper cause or without first obtaining the consent of the foreman or pit boss, he may be discharged.

7.—PENALTY FOR STOPPAGE OF WORK.

If any employee or employees shall cause a stoppage of work in violation of this agreement, he or they shall be subject to discharge by the company without recourse.

If any man or men refuse to continue work because of a grievance which has or has not been taken up for adjustment in the manner provided herein, the pit committee shall immediately, if requested by the company, furnish a man or men to take such vacant places at the scale rate, in order that the mine may continue at work, and it shall be the duty of any member or members of the United Mine Workers of America who may be called upon by the pit boss or pit committee to immediately take the place or places assigned to him or them in pursuance thereof.

8.—DELIVERY OF TIMBER.

The company will deliver all timber as near the working place as practicable, or at the mouth of the room.

9.—TURN OF CARS.

Men in breasts and rooms shall receive, as far as possible, an equal turn of cars, and men in pillars a proportionate turn.

10.—MINERS AS PARTNERS, ETC.

It shall be optional with the management of the mine to work the mines with a miner and a back hand or with miners working as partners. On all company work the company shall employ such classes of men as the work requires, and at the rate of wages provided for in this agreement. The company shall pay the sum of three dollars (\$3) per day to all miners only taken from contract work to do company work. Any miner failing to earn the minimum rate of three dollars (\$3) per shift owing to a deficient condition of his working place, shall be paid by the company a sufficient amount to secure him the said minimum, provided he is a capable man and has done a fair day's work.

11.—CONSTRUCTION OR EXTENSIVE REPAIRS.

No scale of wages shall be made by the United Mine Workers of America, for mine manager, mine manager's assistant, pit boss, breaker boss, company's weightman, boss driver, night boss, head machinist, head boilermaker, head carpenter, head electrician, night watchman, stable boss and all foremen, timekeepers and coal inspector.

It is agreed that all men working on improvements and extensive repairs, and also all employees of the electrical department are not included in the jurisdiction of the United Mine Workers of America.

12.—CHINESE LABOUR.

The companies agree not to employ Chinamen underground, but have the right to work same above

ground, and the United Mine Workers of America agree not to interfere in any way with such employment. The employment of such labour shall not entitle the United Mine Workers of America to call a strike or stop work.

13.—NO INCREASE IN COST EXCEPT AS PROVIDED, AND THE EFFECT OF NEW LEGISLATION.

No change of conditions shall be imposed in Eastern British Columbia and Western Alberta scale for the coming years that increase the cost of production of coal or coke in any districts in British Columbia and Western Alberta, to which this agreement applies, except as may be provided.

This agreement is made and executed, having regard to and in reliance upon the consideration of the present law and conditions regarding the various matters herein disposed of, and if in any time hereafter, and during the life of this agreement the laws are altered or varied or new laws are made so as to impose any new or further burdens upon the company, the company is to be at liberty to modify the terms of this agreement so as to meet the new, varied or altered conditions created by the statute law.

14.—HOLIDAYS.

The following days only shall be observed as holidays: New Year's Day, Victoria Day, Dominion Day, Labour Day, Thanksgiving Day, Christmas Day, Provincial election day, but there shall be no holiday after payday.

15.—FUNERALS.

In the event of an instantaneous death by an accident in the mine or outside the mine, the miners underground and all other employees shall continue at work until the afternoon of the day of the funeral. On the day of the funeral (which must always be held on the afternoon shift) all employees may cease work for the purpose of attending the funeral, it being optional with them whether they shall work or not.

16.—NEW WORK.

Whenever any new work arises, a price for which has not been provided for in this agreement, on the request of the company and the miners, the scale committee of the Western Coal Operators' Association and a properly constituted committee of the miners shall meet within 30 days after the said request and arrange a price. Meantime and until such price has been arranged, all men shall be paid upon the day wage scale.

17.—BRUSHING.

Brushing is understood to be taking down rock from the hanging or foot walls only.

18.—NO MARKET RESTRICTION.

Any operator paying the scale rate of mining, and day labour under this agreement, shall at all times be at liberty to load any railroad cars whatever, regardless of their ownership, with coal, and sell and deliver such coal in any market, and to any person, firm or corporation that he may desire.

MINING ON OBSERVATORY INLET, SKEENA MINING DIVISION.

Local Geology of Prominent Mineral Claims.

OBSERVATORY INLET is again receiving the attention of mining men, chiefly as a result of the work done since last July by S. S. Raymond and J. T. Hille, who have further developed a large body of high-grade copper ore on the Lamon-Jack group or Hidden Creek group of eight Crown-granted claims. The brief information concerning the operations referred to, supplied a few weeks ago to the *Mining Record*, was to the effect that four tunnels, 35 to 85 ft. in length, had been driven into a bluff 400 ft. high in which occurs a body of ore about 350 ft. wide. These tunnels were at different elevations, about 100 ft. apart and all in ore. From 10 to 12 men were employed on the property all last season.

A company (the Hidden Creek Mines, Ltd., with an authorized capital of \$300,000) has been incorporated with the object of acquiring and working these mines. It is understood that efforts are being made to obtain sufficient cash capital to admit of smelting works, to include a copper converting plant as well as blast furnaces for smelting the ore to matte, being erected and equipped; failing this, a plank road will be constructed from the mine to deep water and 1,200 to 1,500 tons of sorted ore will be shipped monthly to a custom smelter until such time as the company shall be in a position financially to establish its own reduction works.

In January of the current year the *Mining Record* reprinted (on pp. 9-13) an official report, by Mr. H. Carmichael, provincial assayer, on "Mineral Locations, Portland Canal District." This, however, did not give any information relative to those on Observatory Inlet, an arm of the canal mentioned. In 1902 Dr. T. Rhymer Marshall reported on the Bonanza and Hidden Creek groups, and his report was included in the "Annual Report of the Minister of Mines" for that year. As this is the only official information concerning the geology of these properties published by the Provincial Bureau of Mines it is here reprinted as probably being of as much interest today as when development on a considerable scale was previously undertaken in that locality.

It may be premised that the mining recorder for Skeena mining division (a division of Cassiar district at that time under the jurisdiction of the Victoria gold commissioner), in his report for 1900, mentioned the Bonanza group of seven mineral claims as "a new discovery made this season, situated about half a mile from the inlet." In his report for 1901 he mentioned that "since midsummer 35 new locations have been made within a radius of five miles of the Bonanza, some of them showing high-grade copper ore." By this time the Bonanza group had been bonded to Mr. M. K. Rodgers and a considerable amount of development work done. In his re-

port for 1902 the same official gave this information: "The idea is widely prevalent that the northern coast of British Columbia is packed up with gold snow during the greater part of the year with a consequent very short mining season. This is a very great mistake. With the exception of a few days in mid-winter, there is not any portion of the Dominion, or northern or eastern United States, where a longer working season obtains. The snowfall at Port Simpson, the most northerly point on the coast of British Columbia, is much less than at Vancouver, the register for last winter, which was an average one, having been 14 in. Mr. J. H. Rodgers, who spent the winter of 1901-2 at the Bonanza mine on Observatory Inlet, and who had a gang of miners working continuously, informs me there was only one day from January 1 until the day I saw him—July 23—on which his men could not work out of doors, and that was on the occasion of a heavy snowstorm in March."

Dr. Marshall reported:*

BONANZA GROUP.

The Bonanza group of mineral claims is situated on a small stream called Mineral Creek, which flows into Goose Bay, Observatory Inlet. The group comprises the North Star, Emma, Emerald, Bonanza, and Princess Louise (all Crown-granted mineral claims), as well as several extension claims, and is owned by the Bonanza Mining Company of Port Simpson. The property was bonded to Mr. M. K. Rodgers, who, however, threw up the option last summer, after having prospected the ground by 800 ft. of tunnels and upraises, as it was found that at considerable depths the ore became of too low a grade. It was accordingly thought important to study the local geology, in order to find out the reason why so promising a prospect, with rich and widespread outcroppings of copper, should yield, on prospecting, such disappointing results.

The Bonanza group lies near the base of a granite mountain more than 4,500 ft. high, with the rounded top characteristic of the district. Immediately above the 3,000-ft. level, islands of argillite schists lie on the bare granite. These are the remains of the sedimentaries which were carried up in the great mountain uplift. Below the 3,000-ft. level the flanks of the granite boss are covered by a small thickness of argillite schists. On the property these schists dip flatly down the mountain side (N. 30 deg. E. magnetic), and are traversed by a belt of mica schists. Spurs from the granite cut through the metamorphic sedimentaries in the form of pale granitic dykes, generally mineralized by molybdenite. (One dyke has a strike S. W. and a dip of 45 deg. S. W.). A later disturbance caused fracturing of the strata and the intrusion of a number of narrow parallel dykes of diabase, the general strike of which is N. E. (magnetic). The evidence in the field is very strong that these basic dykes are of later origin than the

* Annual Report of the Minister of Mines, 1902, p. 11, 2031.

granitic dykes, as the latter cross and fault the former. In the vicinity of the basic dykes the mica schist carries 1 to 2 per cent. of copper. At or near the contact of the dykes and close to the surface, lenses of associated chalcopyrite and pyrrhotite occur. Four of the richest lenses are about 4 ft. thick at the belly, and contain from 6 to 8 per cent. of copper. The long axes of these lenses follow the dip of the strata, which is practically the same as the general slope of the hill and in the same direction. The lenses are found to lie in a very soft mica schist. The mineralized zone crosses Mineral Creek and dips into the hill on the other side, where the mineral near the surface is chiefly secondary iron pyrites.

This property affords an interesting example of the phenomenon of secondary surface enrichment. The schists, which were evidently mineralized with minute quantities of sulphides of copper and iron, during the process of contact metamorphism, were disturbed at a later period with intrusions of basic igneous material in the form of dykes. Open channels were thus made in which "bonanzas" were formed by concentration of sulphide from the surrounding schists. Naturally, in such rock as mica schist, these openings would only occur to a marked extent at or near the surface. Although the property does not give much promise of ore in depth, still a considerable amount of shipping ore could be secured at and near the surface and transported cheaply, owing to natural facilities of location.

A specimen, taken from a grayish white dyke exposed in the bed of Bonanza Creek, near the foot of the ore dump, was sent to the Geological Survey Department at Ottawa for microscopical examination. The following report was made by Dr. Barlow: "The hand specimen represents a hard, compact rock of a light gray colour and porphyritic structure. Under the microscope the rock is seen to consist of phenocrysts of feldspar and biotite imbedded in a microcrystalline quartz-feldspar-calcite ground mass. The feldspar is a plagioclase, probably oligoclase. It is very turbid from alteration to kaolin, epidote and calcite, the former product largely predominating. The form, as a rule, is good, but varies from idiomorphic to very irregular and corroded ones. The biotite is present in relatively small amount, and occurs in irregular individuals and oblong forms. It is much altered either to chlorite or by leaching to a green and then coloured mica, which still retains the high double refraction. A few grains and cubes of pyrite, a grain or two of zinc and apatite complete the section. The rock is an andesite and somewhat altered." Although the rock differs in character from the other granitic dykes, it is undoubtedly associated with the underlying biotite granite.

HIDDEN CREEK GROUP.

The Hidden Creek group, situated on Goose Bay, includes the Manson, Rudge, McKinley, Donald, Alpha, Beta, Gamma, and Caroline mineral claims, owned by the Union Jack Company. The property has been bonded to Mr. M. K. Rodgers. Work on the outcrops has been stopped for the present, but

will be resumed in the spring, when a shaft will be sunk by contract work. The claims are situated on and around Red Mountain, which lies 16 miles N. 30 deg. W. from Hidden Creek Falls. These falls, which will in future prove of immense service as a source of cheap power, are close to the shore of Goose Bay, but are separated from deep water by extended gravel flats. Red Mountain stands out prominently in the landscape and presents one of those extraordinary examples of extensive rock replacements by silica and metallic sulphides. The mountain ridge has a direction N. 30 deg. W., with an elevation of about 700 ft. It is intersected by a number of parallel dykes, more or less vertical and composed of diabase rock, their general strike being N. 10 deg. W. (magnetic). These dykes have been intruded through the mountain mass after the mineralization of the rock, but, nevertheless, they have played an important part by giving rise to conditions causing secondary concentration of the sulphides of iron and copper in rich lenses. The country rocks of the district are black argillitic schists, the schistosity of which is not so well marked as in those found near the mica schist belt on the Bonanza property. The granite underlies the schists on the Hidden Creek property at considerable depth, and the nearest surface exposures are three miles distant from Red Mountain, at Hastings Arm. Red Mountain marks the position of a great fracture zone, the brecciated rocks of which have been subjected to intense alteration by mineral waters ascending from great depths. The ore mass has been traced for 900 ft. along the crests and bluffs of the mountain. The ore is pyrrhotite and chalcopyrite, associated with a quartz gangue. Valuing the entire mass, the ore is very low grade, but in the vicinity of the dykes the lenses are fairly rich, assaying 6 per cent. of copper on the average. As the amount of development work is very small (100 ft. of tunnel work), it is impossible to say how far these enrichments extend into the mountain, but the indications are such as to warrant further development. The southwest side of the mountain slopes steeply to the valley below; near the top the ore is exposed, but the lower 400 ft. are covered with detritus. The mountain drains into a small swampy lake which lies to the immediate south. The mud of the lake is rich ferric hydroxide, which has been formed by the weathering of the great mass above. The silicification of the rock of Red Mountain, however, has been the means of the escape of the mass from the effects of the general erosion of the district, which has proved a useful agent to man by carrying away the surrounding country rock, leaving the great ore core uncovered ready for mining, when means shall have been discovered for handling it at a profit.

An official statement of the Selby Smelting Works shows that a recent shipment of 47 tons of ore from the Hayes-Monette lease on the Mohawk mine at Goldfield, Nevada, netted the shippers more than \$574,000. The ore was therefore worth more than \$6 per lb.

COAL MINING ON VANCOUVER ISLAND.

Information Relating to Nanaimo and Ladysmith Coal Fields.

VANCOUVER ISLAND COAL has always held, on its merits, first place among the coals produced on the Pacific Coast of America. It is not often, though that men fully qualified to speak on the subject, can be induced to give for publication information concerning the coal fields of the Island and their productive coal measures. When interviewed lately by a representative of the *Nanaimo Herald*, Mr. Frank D. Little, general manager of the Wellington Colliery Company, owning the coal mines on Vancouver Island known as the Dunsuir mines, according to that newspaper stated that the coal measures tributary to Nanaimo and Ladysmith were very extensive. Just how great they were no one could say, but many years would elapse with active mining before the measures now explored and positively known to be reserves could be exhausted, with other large and promising sections yet to be opened up. People are apt, said Mr. Little, to get erroneous impressions about the working out of mines. He instanced Nanaimo in 1864 when it was the common talk even among old miners, that with the working out of the Douglas seam, then exposed, all coal mining would be at an end at Nanaimo, which would be in not to exceed 18 months. It is a long while since then, said Mr. Little, and a great deal of coal has been taken out of the Nanaimo mines, but they still lack many decades of being worked out, and what exploration at greater depth will yet show no one can tell.

Regarding Extension mine and others tributary to Ladysmith, he stated that the Wellington Colliery Company expected within from six to twelve months to be shipping from the mines now being opened up on the "short line." About a mile of track would have to be put down and hoisting works erected, as all coal mined at that point would be hoisted instead of being run out by a tunnel. The grade of coal is similar in the mines to that from Extension, and the quantity practically in sight large.

Mr. Little also spoke favourably of conditions at Cedar and thought operations should result in opening up new fields there, or rather a combination of Nanaimo and Extension fields. At Englishman's River the indications are good, but not enough is yet learned regarding the underlying beds of coal to judge of values there. The extensive coal measures of this section were, Mr. Little stated, pushed up from a great depth, probably at the time Mount Benson upraised its head. Gabriola Island at one time was very likely overlying the spot where Nanaimo now is, but was crowded down, either by glacial or volcanic action. For many millions of years, erosion of the surface of this portion of the Island has been slowly going on, until the coal measures, upraised as they were, and with perhaps thousands of feet of the surface ground down and

washed into the sea, the coal was brought up to the surface to be worked.

One thing relative to coal trade conditions is most gratifying, viz., fuel oil has passed its limit. It is now selling at \$1 per barrel instead of 30 cents. The Southern Pacific lately gave a single order for \$1,000,000 worth of coal for its Texas business. The Treadwell Gold Mining Company has not installed oil burners as announced it intended doing, and probably never will. Many steamers are discarding oil tanks, and outside of some small craft, little more will be heard of steamships using oil for fuel.

Mr. Little was asked if there would be any reduction in the present wage scale in his company's mines, or if the 10 per cent. put on in January would be considered a permanent advance. He unhesitatingly stated that from the present outlook the coal trade would continue good for years, perhaps for many years. If so, there would be no reduction in the wages paid by the Wellington Colliery Company.

GOVERNMENT ASSISTANCE TO MINERS AND PROSPECTORS.

IN AUSTRALIA much more is done to assist miners and prospectors in the development of mining properties than in Canada. In New Zealand too, beside operating state coal mines, the government contributes freely to the cost of establishing, equipping and maintaining schools of mines, of which there are at least eight in that colony, in which connection the government had paid during 21 years to March 31, 1906, £43,746 (\$218,730), or an average of about \$10,000 a year during the whole period mentioned.

The following information relative to government aid to mining is from a report of D. H. Ross, commercial agent for Canada at Melbourne, Victoria, Australia, dated November 26, 1906:

The state of Victoria has for years been granting financial assistance to miners and prospecting parties. Under the "Victoria Mining Development Act," loans of any sum up to £10,000 (\$50,000) are made to registered companies, and loans up to £250 (\$1,250) to co-operative parties of miners—the party to consist of not less than two working miners. On application of a mining company being duly reported upon and approved, a mortgage and bill of sale are taken over the company's lease, machinery and plant in order to secure the government in the event of non-payment of the loan. In the case of prospecting parties, an agreement is required that the advance given will be repaid before dividing any profits accruing from the work done by the party in connection with the advance, but no security is asked or given, and in a very few cases has the money been repaid.

The procedure adopted by the state of Victoria in making monetary advances to prospectors and mining parties is usually upon the £1 for £1 basis. The instalments are made to the party or company as the work proceeds, and after the government inspector has satisfied himself that the work has been done, the

government then contributes half the cost and the party or company defrays the other half. Copies of the "Victoria Mining Development Act" under which the loans are made, together with the necessary forms required in connection with same, have been forwarded to the superintendent of commercial agencies, Ottawa, from whom further details are obtainable by those interested.

During the past three years, apart from the ordinary expenditure of the mines department, £43,000 has been voted out of surplus revenue by the Victorian government for aiding mining development by advances to mining companies and co-operative parties, boring for coal and gold, constructing new batteries (stamp mills), providing new and improved drills, and cutting and clearing prospectors' tracks (trails) in mountainous districts. A sum of £37,230 was voted from ordinary revenue for boring and batteries. Nineteen boring plants are at work in various parts of the state. In thirteen of these, foremen paid by the state are in charge. The net cost of working, as far as the department is concerned, after allowing for the crushing fees, amounts to £5,555. The remaining six batteries, which are managed by local committees, have been provided within the last 18 months, and are powerful 5-head plants of the most up-to-date pattern, Wilfley tables and Berdan pans being provided where necessary, the total capital cost of this new mining plant being £14,918.

The revenue of the Ontario bureau of mines during 1906 reached a total of \$250,090. In 1905 the total receipts were only \$61,560.

The statement was made lately in the Dominion House of Commons, by the minister in charge of the estimates, when the item "Ottawa—Royal Mint, \$55,000," was under consideration, that it will probably take another year to finish the building and install the apparatus; also that the supposed minting operations will be begun immediately after the plant shall have been installed. The estimated total cost of the mint, including site, was given as \$373,000.

According to a North Queensland (Australia) paper, one of the most interesting sights of Lightning Ridge opal field is a miner with one leg, the other having been amputated above the knee. This remarkable man, who is known locally by the misnomer of "Peggy," and who is fully 60 years of age, is working alone, and has bottomed a shaft no less than 40 ft. deep. It can be imagined what phenomenal strength and dogged determination are necessary to accomplish such a task under such circumstances single-handed. The descent and ascent are made by means of a rope securely fastened at the top, and down the miner goes hand over hand. He first lowers two coal oil cans into the shaft, then follows them down, and when they are filled with mullock he ascends, and draws the tins to the surface by means of a windlass. He continues this tedious process from early morn until dewy eve, his methods being dexterous and most ingenious.

COMPANY CABLES AND NOTES.

British Columbia.

Le Roi—February: Shipments amount to 10,195 tons, containing 2,530 oz. gold, 4,500 oz. silver and 181,600 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, \$10,000. Expenditure on development work during the month, \$17,500.

Le Roi No. 2—February: Josie mine report: Shipped 1,540 tons. The net receipts are \$20,203 (£6,020), being payment for 1,321 tons shipped, and \$2,940 (£605), being payment for 110 tons concentrates shipped—in all \$32,143 (£6,625). Vancouver mine report: Shipped 22 tons. The net receipts are \$1,847 (£380), being payment for 22 tons shipped.

Slough Creek.—Expect complete erection of new machinery, and have it running by March 22.

Tyce.—Smelter ran 12 days, and smelted—Tyce ore. 1,195 tons; custom ore, 1,073 tons; total, 2,268 tons. Matte produced from same, 135 tons; gross value of contents (copper, silver, and gold) after deducting costs of refining and purchase of custom ore, \$16,738.

Ymir.—The secretary writes: Cables have been received from British Columbia stating that all the company's liabilities have been discharged; that the large compressor is being moved, and that mining in the tenth level and the raise was to be resumed first week in March. It will be remembered that Mr. Gilman Brown strongly recommended that the large compressor be removed to a lower level in order that the water power might be utilized, thereby effecting a large saving in fuel.

U. S. A.

Alaska Mexican.—February: 120-stamp mill ran 7 3/4 days; crushed 5,822 tons ore; estimated realizable value of bullion, \$12,680. Saved 110 tons sulphurets; estimated realizable value \$8,547. Working expenses, \$21,796.

Alaska Treadwell.—February: 240-stamp mill ran 9 1/2 days; crushed 11,956 tons ore; estimated realizable value of bullion, \$19,800. Saved 240 tons sulphurets; estimated realizable value, \$16,466. Working expenses, \$45,296. Short run caused by coal shortage.

Alaska United.—February: Ready Bullion claim; 120 stamp mill ran 7 1/2 days; crushed 5,380 tons ore; estimated realizable value of bullion, \$6,450. Saved 100 tons sulphurets; estimated realizable value, \$3,440. Working expenses, \$17,433.

DIVIDENDS.

On March 5 the directors of the Granby Consolidated Mining, Smelting and Power Company, Ltd., declared a regular quarterly dividend of two per cent. and an extra dividend of one per cent. upon the par value of the stock outstanding, payable on March 30 to all stockholders of record on March 15.

Notice has been given that the International Coal and Coke Company, Ltd., will, on May 1, 1907, pay a dividend of one per cent. on its issued and outstanding stock.

NOTES.

Notice has been gazetted of the appointment of James R. Hunnex, merchant and postmaster, of Erie, B. C., as attorney for the Gordon Mining and Milling Company, Ltd., in the place of Joseph Harrison.

A special meeting of the British Empire Gold Mines was called by D. R. Young to be held at his office Vernon, on March 9, "to arrange important business in connection with immediate incorporation." It does not appear that there are funds available for continuing mining operations. Mr. Young has gone into the real estate business in Victoria.

The mining and placer lease, the gold dredge, and all machinery, tools, plant, etc., of the Iowa Lillooet Gold Mining Company, Ltd. (in liquidation), are to be offered for sale by auction in Vancouver on May 10, prox.

The marble quarries at Nootka Sound, West coast of Vancouver Island, are to be opened at once by the Nootka

Marble Quarries, Ltd. The initial shipment of marble will be made to the United States. Arrangements were made to send up men with the necessary winches, derricks, etc., before the end of March. The company is engaged up the quarries.

At the recently-held annual meeting of the Gold Reef Mines and Mining Company, of Rossland, the following officers were elected for the ensuing year: President, E. Adams; vice-president, H. P. Renwick; secretary, W. H. Dunlop.

The Canadian Marble and Granite Company, which was recently incorporated for \$50,000, is about to commence operations upon its granite quarry at Granite siding and its marble quarry along the line of the Canadian Pacific Railway, between Lardo and Gerrard, says the *Nelson Daily News*. The directors of the company are William Shackleton, H. Simpson, Charles May (ex-mayor of Edmonton), and James Carruthers. A lot of machinery has been ordered and will arrive, it is hoped, almost immediately. The output from both quarries will be shipped chiefly to the new provinces for building uses, and it is the intention of the company to cut marble for ornamental purposes. When in full operation a large number of men will be employed by the company.

CERTIFICATES OF INCORPORATION.

Hidden Creek Mining Company, Ltd., with a capital of \$300,000, divided into 300,000 shares of \$1 each.

Hidden Creek Mining Company, Ltd., with a capital of \$1,000,000, divided into 1,000,000 shares of \$1 each. Objects include the acquirement and working of mineral claims on Bowen Island, New Westminster district, B. C., and elsewhere.

Ten Associates Company, Ltd., with a capital of \$100,000, divided into 100 shares of \$1,000 each. Objects include the acquirement of mineral claims, petroleum and coal-bearing lands, etc.

Pacific Coal Company, Ltd., with a capital of \$10,000, divided into 10,000 shares of \$1 each.

Perfection Pressed Stone Company, Ltd., with a capital of \$20,000, divided into 200 shares of \$100 each. Objects include the manufacture of and dealing in building materials.

British American Oil Refineries, Ltd., with a capital of \$500,000, divided into 100,000 shares of \$5 each. Objects include the acquirement of petroleum or oil-bearing lands and the searching for and winning petroleum and other oils and products thereof.

REGISTRATION OF EXTRA-PROVINCIAL COMPANIES.

British Columbia Portland Cement Co., Ltd., with a capital of \$100,000, divided into 100,000 shares of \$1 each. Head office in British Columbia at Victoria. Attorney (not empowered to issue and transfer stock), Albert Edward McPhillips, K. C., barrister, Victoria.

Metropolitan Portland Cement Co., Ltd., with a capital of \$30,000, divided into 600 shares of \$50 each. Head office in British Columbia at Vancouver. Attorney, David Gordon Marshall, barrister, Vancouver.

Fraser River Copper Mining Company.—Head office at Camden, New Jersey, U. S. A. Capital, \$1,200,000, divided into 1,200,000 shares of \$1 each. Head office in British Columbia at Kamloops. Attorney (not empowered to issue and transfer stock), Scott H. Richmond, manager of said company, Kamloops.

Washington Portland Cement Co., Ltd., with a capital of \$375,000, divided into 1,500,000 shares of 25 cents each. Head office in British Columbia, at Grand Forks, Boundary district. Attorney, Charles M. Kingston, physician.

at Toronto, Ontario. Capital, \$1,500,000, divided into 15,000 shares of \$100 each. Head office in British Columbia at Victoria. Attorney, Harry A. Ross, accountant, Victoria.

Krao Silver-Lead Mining Company, Ltd.—Head office at Phoenix, Arizona, U. S. A. Capital, \$3,000,000, divided into 600,000 shares of \$5 each. Head office in British Columbia at Kaslo. Attorney, W. E. Zwicky, mining engineer, Kaslo.

Walla Walla Portland Cement Co., Ltd., with a capital of \$1,000,000, divided into 10,000 shares of \$100 each. Head office in British Columbia at Paulson, Trail Creek mining division. Attorney, Samuel F. Griswold, miner, Paulson.

TRADE NOTES AND CATALOGUES.

A catalogue descriptive of the Deister concentrator has been received from the Canadian agent for this machine.

The annual report of the Canadian General Electric Company of Toronto, Ontario, showed net earnings for the year 1906 of \$853,675.16, or about 18 per cent. on the capital cost.

The Wellman-Seaver-Morgan Company's Circular No. CA-3, "Mine Cages, Skips and Ore Cars, etc.," is a well-printed and freely illustrated catalogue of some of the manufactures of the company named.

The annual report of the Canadian Westinghouse Company, Ltd., of Hamilton, Ontario, for the year 1906, showed net earnings of \$346,961, an increase of \$126,416 as compared with the previous year.

The Canadian Rand Drill Company, Ltd., of Montreal, Quebec, has published an interesting little booklet on "Compressed Air Appliances," containing useful information concerning hoists, trolleys, and other pneumatic lifting and conveying appliances, together with illustrations; also short notes on Rand air compressors and "Little Giant" drills. Full information and quotations are obtainable from either the company's head office, in Montreal, or its various branch offices, those in British Columbia being at Vancouver and Rossland, respectively.

The Canadian General Electric Company, Ltd., is about to erect in Toronto, a 5-story, steel-frame head office building, to cost about \$400,000. The building will have a frontage of 65 ft. and a depth of 185 ft. Work on the excavations has been commenced.

The increasing trade of the Canadian Westinghouse Company, Ltd., necessitates further additions to its already large establishment at Hamilton, Ontario. Foundations are being put in for a 3-story addition to the office building, and preparations are being made for adding another story to the air-brake plant building. These enlargements are estimated to cost about \$80,000.

Mussens, Limited, has issued its Catalogue No. 11, Metallurgical Machinery. This covers, in a general way, the latest designs in machinery and appliances for the treatment of ores, including sampling plants, concentrators, and concentrating tables, copper and lead furnaces, copper converters, stamp and other mills, cyanide plants, dredges and gold-saving tables, and much other plant and machinery. Full descriptions, specifications and prices, also illustrated special pamphlets on individual machines, will be supplied on request.

The construction and method of operation Davis Calyx diamondless core drill are described in the Canadian Rand Company, Ltd.'s catalogue K-53. It is claimed for this drill that in connection with the two chief factors involved in core drilling, viz., reliable record and reasonable cost, it does better than any similar device. The accompanying condensed specifications give brief particulars of plants driven by steam, gasoline, horse or hand power, while separate articles go into detail in regard to

"Conveying and Transmission" is the title of a periodical devoted to methods for the mechanical handling of materials and transmission of power, published by Stephens-Adamson Manufacturing Company, of Aurora, Illinois, the Canadian representatives of whom are Mussels Limited of Montreal.

Two leaflets received lately are on "Ironing by Electricity" and "Standard Fire Escapes," respectively. The former makes it clear that the electric flat iron, for sale by the Canadian General Electric Company, Ltd., of Toronto, wherever introduced has been found indispensable by reason of its convenience and efficiency. The latter shows types of standard fire escapes made by the Canada Foundry Company, Ltd., of Toronto, Ontario.

Fried. Krupp Aktiengesellschaft Grusonwerk, of Magdeburg-Buckau, Germany, have added to their big manufacturing establishment a separate metallurgical department chiefly for the manufacture of furnaces, machines and apparatus, as well as complete installations for the recovery of metals from ores, either by metallurgical or electro-metallurgical processes, partly according to special systems. The new department will also undertake the working out of plants for metallurgical treatment of lead and zinc dust, waste products, and for the concentration of refractory ores. These old-established manufacturers invite enquiries from all requiring installations for the treatment of ores or machinery (presses and rolling mills) for the mechanical treatment of metals.

The latest publication of the Jeffrey Manufacturing Company of Columbus, Ohio, U. S. A., is its No. 57-B, an illustrated supplement of Jeffrey conveying machinery for saw mills, lumber mills, and wood-working industries. This catalogue contains 72 pages, freely illustrated by half-tone reproductions of photographs of Jeffrey machinery in operation, and demonstrating the numberless industries for which elevating and conveying machinery is adapted.

From Peacock Brothers of Montreal, Quebec, has been received a comprehensive catalogue (pp. 287) of the steel and iron castings of every description, either machined or un-machined, of Hadfield's Steel Foundry Company, Ltd., of Sheffield, England, the sole agents for Canada, for which well and widely known firm are Peacock Brothers. This catalogue has been issued at the suggestion of the Canadian agents for Hadfield's, who have the largest steel foundry in the world and have unequalled facilities for the manufacture of their gyratory crushers, manganese steel castings, wheels and axles, tool steel, picks and shovels, etc., for the mining industry. Mining engineers and mine managers can obtain this valuable catalogue gratis on application to the sole Canadian representatives of Hadfield's Co., Messrs. Peacock Brothers, Canada Life Building, Montreal.

MACHINERY AND CONSTRUCTION NOTES.

A Jeffrey Manufacturing Company's electric locomotive has been ordered for the Snowshoe mine at Phoenix, Boundary district. It will be used for hauling purposes on the tunnel level.

The high-pressure half of a Canadian Rand Drill Company's compound duplex Corliss-valve 15-drill air compressor has been installed at the mill at Camborne of the Eva Gold Mines, Ltd., of Nelson. This engine is direct-connected to a water wheel of 13 ft. 2 in. diameter. The compressed air for operating machine drills will be conveyed up the mountain part of the way through the air pipe-line of the adjoining Oyster-Criterion mine and thence to the Eva mine by a branch line.

The installation of the 1,150-h.p. hoist at the Consolidated Mining and Smelting Company of Canada's Centre Star mine, Rossland, is being proceeded with. The cylinders of this engine are 28 by 60 in., drums 10 ft. diameter by 5 ft. face, capacity 1,350 tons in 10 hours, using 4½-ton skips.

At the West Kootenay Power and Light Company's new hydro-electric generating station at upper Bonington Falls, Kootenay River, near Nelson, one 8,000-h.p. unit is in operation and a second available whenever power beyond the capacity of the first one shall be needed. The voltage transmitted to the Boundary has been up to 40,000 volts since starting the new plant. The 80-mile transmission line has been constructed and equipped for 60,000 volts whenever this high voltage shall be required, but as yet there have been difficulties in the way of Boundary mines and smelters being operated to full capacity, so the demand for power has not thus far been nearly so high as it will be when all obstacles to a largely increased ore output and reduction shall have been overcome.

BOOKS, ETC., RECEIVED.

American Institute of Mining Engineers.—Bi-Monthly Bulletin, No. 14, March, 1907.

Ells, R. W., LL.D..—"Notes on the Mineral Fuel Supply of Canada." By R. W. Ells, LL.D. From the "Transactions of the Royal Society of Canada," second series—1906-1907. Vol. XII, Sec. IV.

Missouri Bureau of Geology and Mines.—Biennial Report of the State Geologist, Ernest Robertson Buckley, Ph.D.

New Zealand Geological Survey.—Bulletin No. 2 (new series), "The Geology of the Area Covered by the Alexandra Sheet, Central Otago Division." By James Park, Director of the Otago School of Mines. Pages 49. Illustrated by maps and half-tone surface views and reproductions of photographs of sections of rocks.

Ontario Department of Lands, Forests and Mines.—"Report of the Bureau of Mines, 1906." Vol. XV, Part I. By Thos. W. Gibson, Director. Pages, 206; illustrated by about 60 half-tone views and two geologically-coloured maps of iron regions. This part of the "Fifteenth Annual Report" passes in statistical review the mining industries of Ontario for the year 1905, gives the reports of the instructors of Summer Mining Classes and of the Inspector of Mines upon the mining properties actually under operation, and presents articles upon "Natural Gas and Petroleum," "Exploration in Mattagami Valley," "Agricultural Resources of Mattagami," "The Animikie Iron Range," and "The Iron Ranges of Eastern Michipicoten."

Royal Colonial Institute, London, England.—Journal of the Institute. Vol. XXXVIII, Part IV. March, 1907.

Smithsonian Institution, Washington, D. C., U. S. A..—"Annual Report of the Smithsonian Institution, 1905." The official part of this report, which is for the year ended June 30, 1905, contains the customary reports of the proceedings of the board of regents, executive committee (with financial statement), and secretary. The appendix, which is by far the larger part of the volume, comprises a selection of miscellaneous memoirs of interest to collaborators and correspondents of the institution, teachers, and others engaged in the promotion of knowledge. These memoirs relate chiefly to the calendar year 1905.

COAL MINING NOTES.

The Nanaimo Herald states that "out in the Cedar district the bore hole is down 1,280 ft. The formation is good and several seams of coal from one inch to two and a half in thickness have been encountered. It is evident, say coal miners, that a regular seam of coal is not far below the drill hole now."

At Frank, Alberta, the cross-cut being driven by the Canadian-American Coal and Coke Company to open its west seam is in about 100 ft., and Manager Moore expects to cut the coal any day now. Plans are being laid to drive

both ways, when the work is completed, in view to getting as large an output as practicable in a short time. The company also intends putting down a slope from the main entry and work will be started on this as soon as the necessary equipment can be installed.

Referring to the cement company in which John L. Howard, president of the Western Fuel Company, is interested at Bellingham, a special dispatch to the *Vancouver World*, after stating what arrangements are being made for its operation, states: "The company is operating the coal fields, recently acquired by it. This coal is a steam fuel of fair quality, can be mined and marketed cheaply, and it is likely it will be placed on the market in competition with the cheaper coals of the upper Sound. In this case Vancouver will also secure other steam coal than that now afforded by the mines of Vancouver Island."

The *Miner's* representative in the *Vancouver Gazette*, in its correspondence from Nanaimo, Vancouver Island, has the following note: "A number of miners have come to the Western Fuel Company's mines from the county of Cumberland, England. This has helped the company considerably, but in the district there is still a shortage of men."

The *Endeavour Progress* is authority for the statement that "the results of the tunneling operations now in progress on the holding of the Endeavour Coal Mines, Ltd., to date, have proved very encouraging. As the tunnel is driven further into the seam the quality of the coal improves, the deposit at the same time seeming to widen out. Already the tunnel is about 100 ft. long, and thus far it has been proved that, as depth is attained, the deposit develops into a fine quality coal, of first class steaming properties, and also that the field is an extensive one."

J. L. Stamford, formerly president of the Northwest Coal Company, having extensive holdings on the North Fork and whose interests have been transferred to F. H. Clergue of The Soo, lately spent several days in Frank, Southwest Alberta. He has been credited in district newspapers with the statement that "a syndicate in which he is interested has acquired another large tract of coal land on the North Fork, or the Livingston River and that he was there to arrange for the beginning of work to be carried on this season." He outfitted a few men and sent them out to begin preparations. He will follow as soon as the weather permits.

The Taber coal mine has been shut down under what the reports from Taber characterize as a lockout. The men had a contract with the company extending to November 1 and providing that the eight-hour day shall go into effect April 1. It is said the company locked the men out because they refused to continue working 10 hours. The matter may be investigated by the Government under the new law.

B. C. GAZETTE NOTICES.

Constable Owen F. Conley of Discovery, Atlin district, to be a deputy mining recorder for the Atlin Lake mining division, with sub-recording office at Discovery, in place of William H. Vickers.

William James Parham of Sandon, to be a deputy mining recorder for the Slocan mining division, with sub-recording office at Sandon, in place of E. M. Sandilands, resigned.

Hugh A. Butler of Wymnton, Atlin district, to be a deputy mining recorder for the Atlin Lake mining division, with sub-recording office at Wymnton, in place of Geoffrey Butler.

Harry Wright of Nelson, to be gold commissioner for the Nelson and Arrow Lake mining divisions, from March 25, 1907, in place of Robert A. Renwick, resigned.

Robert A. Renwick, deputy commissioner of lands and works, to be a gold commissioner for the province, from March 25, 1907.

J. Laing Stocks has returned to Nelson after having been visiting in Great Britain, chiefly in Scotland, for about three months.

J. J. Campbell of Nelson, general manager for the Hall Mining and Development Company, has returned to his home.

G. O. Buchanan of Kaslo, Dominion Government inspector under the Lead Bounty Act, has been spending some time in Victoria on personal business.

Otto Brenner, well known in connection with gold dredging in the Territory, has returned to the Yukon for the ensuing season's mining operations.

O. B. Smith, Jun., superintendent of the Granby M. & S. Company's mines at Phoenix, Boundary district, recently made a trip to the Coeur d'Alenes, Idaho.

James Cronin, who has been visiting his mother in Ireland, was expected to reach New York about March 20 on his return journey to British Columbia.

"The Placer Deposits of Alaska" was the subject of an address by Emil Weinheim before the Senior Mining Society, Columbia University, New York, U. S. A.

James McGregor, inspector of mines for West Kootenay and Boundary districts, made an inspection of a number of mines in the Boundary during the first half of March.

A. H. Gracey of Nelson, manager of the Eva Gold Mines, Ltd., is expected to shortly return from the East, whence he has been on a trip extending over several weeks.

R. C. Miller, assistant gold commissioner for the Whitehorse mining division, Yukon Territory, is having a three months' vacation. He will spend the greater part of his holiday time in eastern Canada.

Virgil H. Hewes, C. E., of New York City, recently proceeded to the Pacific Coal Company's colliery at Bankhead, Alberta, Canada, in connection with the installation there of a fine-coal briquetting plant.

W. Kirkwood, local manager for the syndicate it is understood intend placing a dredge or dredges on the Fraser River for gold-dredging purposes, now makes Clinton his headquarters instead of Lillooet.

T. F. Sutherland has gone north to superintend the carrying out of some development work the Tel-Kwa Mines, Ltd., purposes having done on its mineral claims in the Telkwa mineral belt, Skeena mining division.

James Finlay, lately reappointed superintendent of the Sullivan Group Company's lead-silver mine in East Kootenay, is actively pushing further development on the property, which is situated near Marysville.

L. E. Gooding has resigned from the position of chief chemist and assayer at the Britannia Smelting Company's works at Crofton, Vancouver Island, to go into the saw-milling business in which he is now a part proprietor.

T. R. Drummond, general manager of the Dominion Copper Company's properties in the Boundary district of British Columbia, has gone to Cobalt, New Ontario, where he will be assistant general manager of the Nipissing mines.

H. H. Claudet, of Claudet & Wynne, assayers and mining engineers of Roseland and Princeton, B. C., after having been in Sonora, Mexico, in connection with installations of the Elmore vacuum oil process plant, is in Mexico City on similar business.

H. H. Jones, manager of the Slocan-Cariboo Mining and Development Company, operating on Canadian Creek, has returned to Cariboo for the purpose of commencing the season's placer gold mining work immediately local conditions shall be favourable for doing so.

Smith Curtis of Roseland, for years actively interested in the development of the Oro Denoro mine, Boundary district, now owned by the British Columbia Copper Company, has arranged to proceed to Boston in connection with the sale of another mining property.

Eugene Coste of Toronto, Ontario, immediately after the return from Cobalt, New Ontario, of the Canadian Mining Institute party, of which he was a prominent member, went west, to resume the supervision of oil-boring operations in Saskatchewan and Alberta.

J. C. Gwillim, of the School of Mines, Kingston, Ontario, who for years was associated with mining in British Columbia and Alberta, will during the summer vacation be engaged in mining engineering work for the Consolidated Mining and Smelting Company of Canada, either in the West or in Ontario.

Frank N. Anderson, formerly of New Mexico, died last month at Golden, B. C., where he had been engaged in the capacity of mining engineer to the Laborers Co-operative Gold, Silver and Copper Mining Company, Ltd., of Chicago, Illinois. The body was taken to New Mexico for burial near the old home of the deceased.

A. Chester Beatty of Denver, Colorado, U. S. A., assistant general manager and consulting engineer for the Guggenheim Exploration Company, who last year visited the mining properties in Cariboo, Atlin and the Yukon acquired by the Guggenheim interests, has gone to Congo Free State, Africa. He is expected to be absent from America several months.

S. S. Griswold, superintendent of the Inland Empire Mining and Milling Company, working mining property in the Grenville Mountain section, between Rossland and the Boundary, has been quoted as having stated that the company is in a good financial position and will shortly install a hoisting engine and do more development work.

Bruce R. Warden, one of the Canadian Pacific Railway Company's mining engineers for some time past engaged at that company's colliery at Bankhead, western Alberta, has been retained by the Nicola Coal and Coke Company to superintend the installation of machinery and plant at its Middlesboro' colliery, Coutlee, Nicola district of British Columbia.

Robert R. Hedley, late manager of the Hall Mining and Smelting Company's smelting works at Nelson, is accompanying Mrs. Hedley and children to Portland, Maine, going with them thus far on their journey to England. Prior to leaving Nelson both Mr. and Mrs. Hedley were the recipients of valedictory gifts made by a number of the old employees at the smelter.

Hon. Richard McBride, minister of mines, in his capacity of premier of British Columbia is proceeding to England for the purpose of making such representations in the proper official quarter as the Provincial Government deem necessary in connection with the question known as "better terms" from the Dominion of Canada in its financial relations with this Province.

Henry White, well known in the Boundary district as a pioneer, having for years had mining interests, both in the Old Ironsides and Knob Hill, two of the chief claims in the group now being operated on a large producing scale by the Granby Company, and in White's camp nearer the International Boundary line, is stated to be developing a copper property in the Inyo Mountains, California.

Henry Harris, who recently resigned as superintendent of the Hall Mining and Smelting Company's smelter at Nelson, British Columbia, has gone to Hadley, Prince of Wales Island, southeast Alaska, where he will be superintendent of the smelting works of the Alaska Smelting and Refining Company, of which Thos. Kiddie recently assumed the management in succession to Paul Johnson.

John Knox, Jun., formerly superintendent of the Eva group, near Camborne, Lardeau, is reported to have been appointed superintendent of the underground workings of the Calumet and Hecla group of copper mines, Houghton county, Michigan, U. S. A. These mines are described in Stevens' "Copper Handbook" as "the greatest copper producers of the world, and the most profitable mines of any metal."

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H. DARLING, VANCOUVER.

An Ottawa press dispatch states that Dr. Reginald A. Daly, geologist for the Canada International Boundary Commission, has accepted the professorship of physical geology of the Massachusetts Institute of Technology. As the position involved is one of the highest in that branch of learning in the United States it is an evidence of the appreciation felt for the ability of Dr. Daly. He will leave Ottawa in a few months' time, and commence his new duties on October 1. Dr. Daly came to Ottawa in 1901 to accept the position which he has held up to the present. Previous to that time he occupied a chair at Harvard University. At the Massachusetts Institute of Technology he succeeded the place of Prof. W. O. Crosby, who retired on a pension from the Carnegie foundation. Professor Daly was born in Canada in 1871.

Beside the mining men principally concerned in the case—J. M. Harris of the plaintiff and Byron N. White of the defendant company—the following mining engineers have been subpoenaed to give expert evidence in the Star vs. White matter, which extra-lateral rights cause has been before the courts of British Columbia for six years: For the plaintiff, Frank L. Sizer of Helena, Montana, and S. S. Fowler of Nelson, B. C.; for the defendant, Max Boehmer of Denver, Colorado, and W. J. Elmendorf of Spokane, Washington. W. E. Zwicky of Kaslo, B. C., manager of the Rambler-Cariboo Mines, Ltd., who was appointed by the Supreme Court several months ago to do certain work to determine the facts in connection with the occurrence of what in this connection is known as the "black fissure," has also been notified to attend the Full Court sittings and report the results of that work.

An engine driver at the New Koh-i-noor mine in the State of Victoria, Australia, has invented an alarm to indicate to the driver cases of over-winding. The apparatus is simple in construction, and its cost is moderate, £5 10s. (about \$27) being sufficient to completely install it. The "traveller" on the indicator board, by coming into contact with a lever on the danger signal, completes an electric current, and causes a bell to ring. The alarm is on the brace, and sounds if the driver overwinds even 6 in.



EXAMINATION FOR CERTIFICATE FOR LICENSE TO PRACTISE IN AUSTRALIA

AN EXAMINATION for Assayers will be held in Victoria on the 27th May and following days.

Entrance for any examination must be made in writing to the Secretary of the Board of Examiners, at least ten days before the date set for beginning of examination, and must be accompanied by the prescribed fee (\$15).

Any additional information desired may be obtained from Herbert Carmichael, Secretary, Board of Examiners, Victoria.

RICHARD McBRIDE,
Minister of Mines.

Department of Mines,
Victoria, B. C., 15th April, 1907.

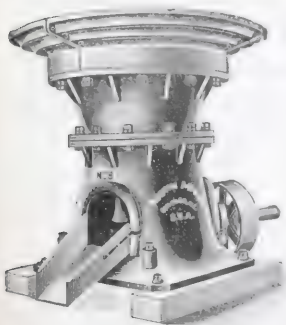
The Calumet & Hecla Mining Co. of Houghton, Michigan, U.S.A., which employs about 7,000 men, will by April next have paid in dividends \$100,000,000 or \$1,000 per share on its 100,000 shares. The amount of cash paid in on capital stock account was only \$1,200,000.

One of the largest single shipments of zinc ore from the Joplin district, Mo., was made recently. It consisted of 21 cars, containing in all 672 tons. It was sold on a basis price of \$45.50 per ton of ore assaying 60 per cent. Actual assays of carload samples ranged from 61 to 63.7 per cent.

The production of aluminium in the United States has increased more than tenfold in as many years, says *The Board of Trade Journal*. Two reasons explain this phenomenal growth—economic production, which has initiated lower prices, and increased consumption, especially in the electrical industry.

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HERBERT B. BROWN,
Hedley, Similkameen, B. C.



SYNOPSIS OF CANADIAN HOMESTEAD REGULATIONS.

Any available Dominion Lands within the Railway Belt in British Columbia, may be homesteaded by any person who is the sole head of a family, or any male over 18 years of age, to the extent of one-quarter section of 160 acres, more or less.

Entry must be made personally at the local land office for the district in which the land is situate.

The homesteader is required to perform the conditions connected therewith under one of the following plans:

(1) At least six months' residence upon and cultivation of the land in each year for three years.

(2) If the father (or mother, if the father is deceased), of the homesteader resides upon a farm in the vicinity of the land entered for, the requirements as to residence may be satisfied by such person residing with the father or mother.

(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

Six months' notice in writing should be given to the Commissioner of Dominion Lands at Ottawa of intention to apply for patent. Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2000 lbs shall be collected on the gross output.

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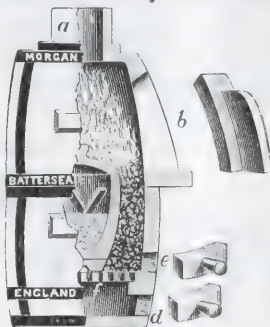
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NOTES AND COMMENTS.

Revised figures show British Columbia's mineral production in 1906 to have been nearly \$25,000,000.

The *Storcan Mining Review* intimates that the Whitewater mill may be at work again by the middle of May.

The concentrating mill at the Ruth mine, Sandon, is being prepared for operation during the ensuing summer.

An examination for assayers for licence to practise assaying in British Columbia will be held in Victoria on May 27 and following days.

"There is an increasing shortage of men at the mines," says the *Beaumont Creek Times*. "The demand for more help is heard continually."

There has been a steady advance in the value of British Columbia's mineral production during the last five years. For 1902 the total was \$17,486,000; for 1906 it was nearly \$25,000,000.

All provincial annual free miners' certificates will expire on May 31. In order to retain rights in mineral claims not Crown-granted, certificates must be renewed on or before the date mentioned.

When in Nelson on April 23 the manager of the Ymir mine informed the *Daily News* that it is intended to resume work in near future as arrangements, already ordered, shall have been completed.

Those interested in mining and other developments on the larger islands of the Queen Charlotte group will be pleased at provision having been made for less infrequent mail communication in the future. Two services are being arranged for.

It is reported from Nelson that the La Plata mill, on Kokanee Creek, near Nelson, is creating about 500 tons of silver-lead ore daily and will be able to continue doing so until the season of low water arrives. The mill is driven by water power.

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If all the coal bores now working are successful, Vancouver Island will soon be a beehive of coal mines, says the *Nanaimo Free Press*. Four bores are now in operation; the Dunsmuir at Englishman's River, the Eastman at Nanoose, the Cedar district, and the bore at Courtenay.

According to the *Slocan Mining Review*, published at Sandon, "the long-headed ones say the present is not the time to sell zinc but to collect it. They believe that a few dollars extra spent in separating out the high-grade zinc during sorting will show a good profit before the year is out."

From the lately-published "Mineral Resources of the United States" it is learned that the exports of domestic quicksilver from San Francisco, California, to British Columbia during two successive years were as follows: In 1904, 205 flasks, valued at \$8,739; in 1905, 23 flasks, valued at \$870.

The work of sinking the main four-compartment shaft at the Le Roi mine, Rossland, below the 1,350-ft. level, commenced several months since, is progressing satisfactorily. A depth of 1,650 ft. was reached by the end of March, and the contractors were using all expedition in sinking to a deeper level.

On April 20 the *Grand Forks Gazette* mentioned that "the Granby smelter has been running seven furnaces during the past week or ten days and some phenomenal runs have been made." It also noted that during that week Boundary smelters by treating 33,516 tons of ore had beaten all their previous records.

The offices of the *Mining and Scientific Press* are now at 667 Howard Street, a few doors east of Third Street, and close to the financial district of San Francisco. We congratulate our esteemed contemporary in having at length become settled in permanent quarters after its year's temporary sojourn at Berkeley, rendered necessary by the destruction of its former abode at the time of the great disaster of April 18, 1906.

The *Canadian Mining Journal*, Toronto, Ontario, has published and distributed a 10x16 half-tone showing the officers and council of the Canadian Mining Institute for 1906-7, several of the members of which are prominently connected with the mining industry of British Columbia and others have also been in past years. The group is of general interest as being representative of the geologists, mineralogists and metallurgists of Canada.

With the favourable reports now coming from all parts of the Slocan as to the results of the winter's work in the mines and the cheerful prospects for the season, together with the announcement of the Government's decision to spend all available money on public works to assist the opening up and devel-

opment of the country, in the opinion of the *Nelson Canadian* there seems to be ample justification for the expectation formed of a genuine mining revival in Kootenay's silver district.

According to the *Ashcroft Journal*, the latest advances from the Tamarac mine in Highland Valley, where development operations are now being prosecuted, are that an ore body some 9 ft. in thickness has been uncovered. This ore will range from 12 per cent. copper upwards, it also carries small values in gold and silver.

An enlarged output of lead-silver ore at the Sullivan Group Company's mine is reported. One recent week's production was about 1,000 tons, which is stated to be an increase of 30 per cent. over the ordinary weekly output for some time past. The ore is all treated at the company's lead smelter at Marysville, a few miles from the mine.

The Dominion Copper Company is further increasing the equipment of its mines in Phoenix mine. At its smelting works at Boundary Falls the erection of the large blast furnace—the largest copper-smelting furnace in Canada—is well forward. The addition of this furnace increases the smelting capacity of these works to between 1,400 and 1,500 tons per day.

Preparations are being made for the ensuing season's placer gold mining on both Wild Horse and Perry Creeks, in Fort Steele mining division. On the former the Invieta, Xip and Tuck and Brown-Larsen properties, among others, will be worked. The heavy snowfall of the 1906-7 winter promises an abundant supply of water for gravel-washing purposes.

The *Nanaimo Herald* has stated that "a single order has been accepted by the Wellington Colliery Co. to furnish 20,000 tons of sack coal for Nemic parties." Our information is that while no undertaking has been given that this stated quantity will be supplied, efforts will be made to supply as much as shall be practicable under the condition that an active demand from numerous other quarters has also to be met.

Ore shipped in quantity from the Richard III mine at Mt. Sicker, Vancouver Island, is returning a few cents less than \$14 per ton net, after deduction of transportation and smelting charges. More than 1,000 tons were shipped during April. Should nothing occur to prevent the directors expect that the Richard III Mining Co. will soon be in a good enough position financially to justify the payment of a dividend to shareholders.

Hon. H. W. Cushing, minister of public works for the province of Alberta, while at Fernie recently in connection with the settlement of the differences between the coal mine operators and miners, tele-

graphed Premier Rathbord, also of that province, as follows: "Position here serious. Have promised miners that our government will pass an eight hour bill to build at next session of the legislature. Do you approve?" The Premier replied: "Your telegram received. I approve of your assurance to the miners."

At the Krao mine, Ainsworth, the shaft has been deepened to 200 ft. and sinking is being continued, the intention being to go down to the 300-ft. level. A station is being cut at the 200-ft. level. Further development work is to be done on the 100-ft. level, and drifting and cross-cutting at both 200 and 300 ft. depth will be undertaken as soon as practicable. Some 20 men are employed at the mine, the work in which is being done under the supervision of W. E. Zwicky, manager of the Rambler-Cariboo mine in Slovan district.

The Queen Victoria, in the Nelson mining division, made its first shipments in March, in which month it sent about 400 tons of copper-silver ore of fairly good grade to the smelter at Trail. It was expected that the output for April would be about 1,000 tons. Production will be gradually increased in later months. The ore is being broken down from a big bluff of mineralized rock and is roughly sorted before shipment. N. J. Cavanaugh, formerly at the Slocan Star mine, is in charge of operations, in which 22 men are employed.

Several mines in the Nelson mining division give promise of making a better showing in 1907 as regards ore production than they did in 1906. These are the Silver King and Eureka, both situated within a few miles of the town of Nelson; the Queen Victoria, a copper property near Beasley Siding, about seven miles west of Nelson; the La Plata, formerly known as the Molly Gibson, on Kokanee Creek, east of Nelson; and the well-known Ymir gold mine, in the Ymir section of the division, now under new management, and provided with ample funds for further development.

Will someone please send a Canadian geography book to the office of the High Commissioner for Canada in London, England. Among other notices from that office published in a recent number of the *London Mining Journal* is the following: "Ores rivaling in character those of Colaba are said to have been discovered at Larder Lake, British Columbia." Possibly the mistake was made at Ottawa, whence the cable was dispatched to London. In any case it is in Ontario the sensational discoveries of rich mineral are being made; British Columbia's turn may come later.

The Silver King mine, near Nelson, is to be worked by the Hall Mining and Smelting Co., Ltd., on its own account, the partnership arrangement between the company and M. S. Davys having been

cancelled. An understanding has been arrived at with the owners of the adjoining Dandy mineral claim permitting the sinking of a level from the Dandy into the Silver King mine to connect with the workings of the latter at a depth that will drain the mine down to the seventh level without incurring the constant expense of pumping. All ore of payable grade accessible above that level will thereafter be mined and shipped to the smelter.

In making up the form in this issue containing Mr. Cairnes' report on "Explorations in a Portion of the Yukon," (*ride* pp. 152-157) it was found necessary to cut out a few lines. From page 156, immediately preceding the statement "Wanda and Wanda River Properties," the following was excised: "Some native copper is found on the east side of Windy Arm, but the work done is insufficient to determine whether it exists in paying quantities. The ore values given in this report were obtained from a number of samples taken and also from a great number of assays—returns kindly shown the writer by mine managers, mine superintendents, prospectors and others, during the season."

At the British Columbia Copper Company's smelter, Greenwood, the third large blast furnace has been completed. Although having a nominal capacity of 600 tons per day it has been found that the new furnaces will each treat about 700 tons in 24 hours, so that the capacity of the works is fully 2,000 tons of ore per day. At the company's various mines good progress continues to be made. Several levels down to the 400-ft. are being extended in the Mother Lode mine. At the Enma electricity is being supplied for power purposes, the transmission of 40,000 volts from Bonington Falls generating station to the Boundary giving ample power for both mines and smelters of the district.

The higher postage rates lately determined upon necessitate the payment of two cents postage on every copy of the MIXING RECORD going to the United States. Will our numerous subscribers in that country please bear in mind when remitting their subscriptions that a post office or express money order will be the most safe and sure mode of payment. The United States costs us 25 cents exchange. If we are called upon to pay 50 cents in exchange and postage we lose one-quarter of our subscription income. In common fairness, our subscribers should see to it that we do not have to pay an exchange charge in addition to a much higher postage rate than has heretofore been charged.

[illegible]

it has been compelled to agree to permit them to work two Sundays out of each month. No one will be compelled to work, but those desiring to do so may work every other Sunday. The men claim that in other camps they may work, so if they may not do so in Boundary mines they will go elsewhere. Of course, remarks the *Times*, there are many others who feel the necessity of the Sunday's rest and will not work anywhere on that day.

In its Mining Market comments the London *Mining Journal* said, on April 13, "it is announced that the Alaska United, Alaska Treadwell and Alaska Mexican have closed down in consequence of a strike of the miners, but the news has not affected the price of shares." The following week it stated that "Americans generally show lower prices on the week. Alaska Mexicans fell to 21 $\frac{1}{8}$, Treadwells to 6 $\frac{1}{4}$, and Uniteds to 15 $\frac{1}{8}$ on the strike of labour reported last week, but have since recovered a portion of the loss." The closing prices on April 12 were: Mexicans, 25-16@27-16; Treadwells, 65 $\frac{1}{8}$ @67 $\frac{1}{8}$; Uniteds, 111-16@113-16. A cable dated April 17 advised that there was "part crew at all mines." Local newspaper dispatches intimate that the miners have returned to work without their demands having been acceded to.

The long tunnel in the Highlander mine, Ainsworth, is being extended, Geo. H. Barnhart, several years ago manager of the Ymir mine, having a contract for driving another 1,000 ft. Mr. Barnhart is also operating the Libby, Spokane and Glegarry properties, all in Ainsworth camp. Mining work in this camp will be much expedited and costs reduced should the owners of the Taylor hydraulic air compressor, installed in a neighbouring creek in 1900 by the Kootenay Air Supply Company, Ltd., again supply the mines with power. The first drill ever operated by compressed air under the Taylor patents was started in one of the Ainsworth camp mines in April, 1900. The revival of interest in local mines which has taken place during the last year will probably lead to this compressed-air supply system being utilized to a greater extent than in former years when previously in operation.

The provincial mineralogist lately received from Lillooet, on the Fraser River; two ounces of black sand concentrate containing platinum, which he forwarded to Philadelphia, Pennsylvania, U. S. A., where it was sold for \$49.60. No information was received as to the source of the sand from which the concentrate was obtained, but it was probably the Fraser. Heretofore no platinum has been reported as having been found in any other tributary of the Fraser than the Quesnel, which joins the larger stream near Barkerville, Cariboo, about 200 miles north of Lillooet. It is not known to occur about Barkerville, neither in the Fraser nor its tributaries north of Quesnel; neither has it been reported as having been discovered in streams in the Lillooet district

emptying into the Fraser. Failing any other explanation, it would appear that if found in the Fraser near Lillooet the platinum was carried down that river from Quesnel.

With the completion of the railway to Nicola many changes for the better have taken place, and although there is no boom nor excitement on, everything looks as if there will be a prosperous year for Nicola Valley, says the *Nicola Herald*. The coal mines are doing good and substantial work, and in a short time there will be other industries started up as a result of the working of the mines. At Coal Gully all the coal that can at present be produced is disposed of as fast as taken out, and as soon as conditions shall be sufficiently advanced the working force will be increased and several hundred tons of coal mined daily. At the Diamond Vale property a number of men have been engaged in installing machinery, erecting houses and sinking shafts to the coal seams. This company has favourable prospects of becoming a producer of coal in a few months' time. With the work above-mentioned going on, that part of the valley is quite busy, and good results are extended to other parts.

The Skylark Development Co., Ltd., of Phoenix, has made its final payment on account of the purchase of the Skylark mine, and the property has been duly conveyed to the company. On October 1, 1904, the Skylark and Denver mineral claims were taken under bond by a syndicate chiefly of practical mining men resident at Phoenix, distant two to three miles from the mine which about ten years ago shipped a quantity of high-grade ore but had not since been worked for some six years. Briefly stated, observed the Phoenix *Pioneer* in its last Holiday Annual, "the owners of the Skylark have, in about two years, developed the property to such advantage that the price of the bond, \$30,000, together with cost of operation, have been paid out of proceeds of ore mined and shipped from it." Values in Skylark ore are silver, gold, and a little lead, running as high as \$150 per ton in carload lots. The mine has been opened and developed by three levels down to 250-ft. depth.

The Government of British Columbia has decided not to give its assent to any prosecutions under the Lord's Day Observance Act, so the attorney-general stated in the Provincial Legislature just before it was prorogued on April 25. It is understood that the members of the executive council of the Province gave the matter their careful consideration and eventually came to the conclusion that conditions prevailing in British Columbia differ so much from those obtaining in eastern Canada that in their judgment it would be best to take advantage of the optional power the act gives provincial attorney generals to refuse assent to prosecutions under its other provisions. It will follow, therefore, that the interruption to carrying on the mining and smelting industries

of the Province as in the past will not take place, as prematurely suggested it would. Incidentally it may be mentioned that some of the larger mines have for several years been in the habit of suspending all mining work on Sundays.

Newspaper advices from Rossland sent out at the close of March were to the effect that the M. R. Galusha, manager of the Jumbo Gold Mining Co., Ltd., had raised a considerable sum of money and that as a result work would shortly be resumed on the Jumbo mine, situated near Rossland. The ore production of this mine according to published figures, has been as follows:

	Tons.
To end of 1903.....	13,295
In 1904.....	13,298
In 1905.....	11,188
In 1906.....	2,600
Total.....	31,481

Heretofore the development work necessary for a continuation of production has not been done. It is stated that it is intended to in future keep development well ahead of production so as to ensure uninterrupted operation of the mine.

The *Engineering and Mining Journal* of New York publishes the following concerning the Granby Consolidated Mining, Smelting and Power Co., which is operating in the Boundary district of British Columbia: "Hayden, Stone & Co. report that adverse weather conditions, together with a fuel shortage, proved a serious handicap to operations during the winter months, in consequence of which production suffered. Results for March, however, were probably the most satisfactory for those of any like period in the company's career. Net earnings were in excess of \$225,000, while the cost of production was approximately 7.64c per lb. copper. For the nine months ended March 31, the Granby has secured net earnings in excess of \$1,600,000. Under normal working conditions it is capable of supplying 25,000,000 lb. of copper per annum, at a cost of 8c. per pound. The company has a well-filled treasury, an excellent management, an extraordinary ore supply, and one of the best smelting plants in the country."

The hearing of the extra-lateral rights mining case of Star vs. White by the Full Court of British Columbia has been concluded and judgment has been reserved. This cause, in which defendant is being sued for a large sum of money as compensation for ore taken from the claim of plaintiff, has been before the courts for about six years. About two years ago the chief justice gave judgment in favour of the defendant, but last year plaintiff secured an order from the Full Court directing that certain additional work be done and W. E. Zwicky, manager of the Rambler-Cariboo mine, Slocan, was appointed by the court to supervise the doing of this work. Both sides called

experts to pronounce upon the result of this work for the plaintiff, Frank E. Star of Helena, Montana, and S. S. Fowler of Nelson, British Columbia; for the defendant, Max Bodemann of Denver, Colorado, and W. J. Elmendorf of Spokane, Washington. The recent hearing occupied the attention of the Full Court about a fortnight. As the amount involved is \$500,000, the judgment of the Full Court is awaited with more than ordinary interest. The mines concerned are adjoining properties in the vicinity of Sandon, Slocan.

The *Mining and Scientific Press* of San Francisco published, on April 20, an "Earthquake Anniversary Number." Its initial editorial note said: "It is a year since the earthquake-fire. We celebrate the anniversary by publishing this special number, in which an account is given of the reconstruction of San Francisco, together with other matter appropriate to the occasion." The number is instructive, the more so since it is outspoken in regard to faults and failings as well as appreciative of the pluck and enterprise which have achieved the large measure of success already reached in restoring the "City of the Argonauts." One editorial article, headed "San Francisco," is frank to a degree; another, entitled "Looking Back," tells of the troubled conditions under which this influential and widely-read journal has been conducted throughout the year since the disaster. Three special articles, respectively "The San Francisco of Today," "A Year of Reconstruction," and "Reinforced Concrete Construction," in addition to being of general interest give information of practical value to builders and others connected with construction work. The number is distinctly a credit, even to a journal which maintains the high standard characteristic of the *Mining and Scientific Press*.

Speaking in reference to the situation generally at Rossland, Mr. A. J. McMillan, managing director of the Le Roi Mining Co., Ltd., a few days before the recent strike at the Crow's Nest Pass and other western collieries, said to a representative of the *Rossland Miner*: "In common with all the other mines in the country, we have had lots of trouble this winter as a result of coal and coke shortage, and inability of the railways to handle traffic. Several times it looked as though we would have had to close the mine, owing to the fact that the smelters could not handle the ore, but our policy throughout has been to keep the mine going and the men steadily employed. Owing to the fact that we had arranged to start our smelter at Northport, we were able to store a quantity of ore there, and so keep things moving steadily at the mine all winter. Most of the mines in this camp are low grade, and as the copper contents of the ore are low—gold being the chief factor—the use of coke in smelting does not help us in Rossland as it does the mines in some other districts. It is only by exercising rigid economy that Rossland mines can be made to pay dividends, while

they have commenced to do. It is to be hoped that for some time to come there will be no further troubles, and should that prove to be the case, I shall look for much more prosperous times at Rossland."

We would respectfully suggest to the editor of the Dominion of Canada *Labour Gazette* that he cease publishing such mining news (?) as the following from the Nanaimo correspondent of that publication: "There was considerable activity among the quartz mines, but not much work started as yet, it being too early in the season." This is not the first time a statement of this kind has appeared in the *Labour Gazette*. Of course it carries its own contradiction, for "considerable activity" is not usually the result where "not much work" is being done. As a matter of fact there are no producing lode mines, neither "quartz" nor any other metalliferous mines, in what is usually regarded as "Nanaimo and district," though there may be a few small "prospects" not considerably developed and which have not yet reached the ore-producing stage. There are several producing mines on Texada Island, which happens to be in what is officially known as Nanaimo mining division, as is also country up to 200 miles north of Nanaimo. The mines at Mt. Sicker, about 25 miles south of Nanaimo, are in Victoria mining division, and the Victoria correspondent of the *Gazette* makes reference to one of these, but strangely omits mention of the Tyce, the largest working mine on Vancouver Island and which has done more development work and produced more ore than all the others combined. If the *Labour Gazette* will require its correspondents to be definite in their mining news it will probably get some facts. Vague generalities, such as that here taken exception to, are worse than useless since they suggest the existence of an industry which is not a reality.

Mr. A. C. Flumerfelt of Victoria has offered prizes to the value of \$50 each for the most complete answers to a series of questions he has outlined in a communication published in the provincial press, no one person to reply to more than one question. The several subjects are, respectively, mining and smelting, timber, fisheries, agriculture, manufacturing, finance, and labour and capital. On the subject of mining and smelting the requirement is stated as follows: "Give a description—by districts—of the various coal and mineral areas; an account of the work now proceeding; detailed production for 1906; value of same; average number of hands engaged; practical suggestions for the developing and increasing this most important industry." The greater part of the information thus asked for will be contained in the "Annual Report of the Minister of Mines" for 1906, now being printed. It may be that there will be found those sufficiently in accord with Mr. Flumerfelt's published ideas of what will be in the public interest to devote to it for the love of doing so the time necessary to meet this large requirement. Whether or not anyone well qualified to make the

practical suggestions asked for will do so, remains to be seen. We shall be glad to find that Mr. Flumerfelt's laudable desires meet with a ready response, but are not sanguine in regard to the last-mentioned part of this particular subject. Mr. Flumerfelt has already altered one condition we thought might prevent the mining and smelting subject being adequately dealt with, viz., that no paper should exceed more than 3,000 words. We now suggest that it will be well to soon announce the names of the gentlemen who are "to determine the winners and award the prizes."

On one page of a recent issue of the *Mining Reporter* of Denver, Colorado, U. S. A., there is an editorial protest against "the extravagances and absurdities of many of the mining items appearing from time to time in the mining camp press." Strange to say, that is just the complaint we have to make against the *Mining Reporter*, which seemingly "cribs" news about British Columbia and, not having any intelligent knowledge of local conditions and geography, misrepresents things. For instance, on another page of the same number as that above alluded to the following item of news (?) is given: "Operations on the coast are considerably interfered with at present on account of a coal shortage, occasioned by labour troubles at the Crow's Nest coal fields." The source of the coal and coke supply for coast industries is Vancouver Island, where there are several collieries within a few miles of the sea. Freight charges for the long railway haul from the Crow's Nest collieries being prohibitory, no fuel for the coast is obtained therefrom, unless under very exceptional conditions. Under the sub-head "Slocan District," this veracious journal says: "The shipments from the camp for the week ending April 13 were 4,204 tons, making a total for the year of 33,364 tons." According to the *Nelson Daily News*, which publishes a weekly statement of ore shipments, there were in that week only 64 tons of Slocan ore shipped, while the greater part of the total tonnage given as that of the year to date was from mines not in the Slocan district, though in Kootenay. Again, on still another page, the *Mining Reporter* says: "The Alaska Southern Railway Company has been incorporated to build and operate a railroad for Skagway, Alaska, to Port Simpson, British Columbia." About 400 miles of deep sea water along channels protected from the open ocean by the Alexander Archipelago, connect these two places. The shore line is extremely rough, broken by fiords and other inlets backed by mountains. The suggestion that a railway will be built to connect these places is, to use some of the *Mining Reporter's* own words, "so palpably ridiculous and unreasonable as to make superfluous on our part any comment thereon." We venture the hint, however, that some people might with advantage renew their acquaintance with two verses in the "Good Book" concerning the mote in thy brother's eye and the beam in thine own.

MCGILL SUMMER MINING SCHOOL.

THE MEMBERS of McGill Summer Mining School will pay a brief visit to the cities of Vancouver and Victoria before returning East after having spent the time allotted for study at mines and smelting works in the West. The following information concerning their movements has been obtained from an authoritative source by the *MINING RECORD*:

The members of McGill Summer Mining School, with Dr. J. Bonsall Porter, professor of mining at the university, in charge, are now in the interior. The itinerary of the party part of which has been carried out, is as follows:

Ontario—Cobalt, (silver-nickel-cobalt mines), two days.

Alberta—Lethbridge, one day; Frank, two days; Coleman, one day, (good mines).

British Columbia—Mexie (lead-silver mine and concentrating mill), one day; Nelson (lead-silver smelter), one day; Poorman mine and mill (gold), and Bonington Falls (hydro-electrical power generator), one day; Rossland (gold-copper mines), nine days; Trail (copper and lead smelter, lead and silver refinery), one day; Boundary (copper mines and smelters), three days.

The party is travelling in a special car which, under contract, is to be "back by June 1st," consequently there will be little time available for visiting the coast cities. According to present programme, stated in a letter received by Mr. W. F. Robertson, provincial mineralogist, from Dr. Porter, the party will leave the upper country on May 22nd, reach Vancouver and Victoria on the 24th, and leave the latter city on the return trip on the night of the 25th, unless, as is possible, arrangements shall be made to stop over until 27th.

GOOD FEELING AT ROSSLAND BETWEEN MINE MANAGERS AND MINERS.

Miners' Union Appreciate Advance in Men's Wages.

AN ADVANCE IN WAGES of 25 cents per day has been granted to shovellers, carmen, ore sorters, and surfacemen employed at Rossland mines, as from May 1. This brings the wages of men so engaged up to \$3 per day, instead of \$2.75, the latter being the rate heretofore paid in Rossland camp. Men similarly employed in Boundary district mines have long been paid at the rate of \$3 per day. The companies that have agreed to this advance are the Consolidated Mining and Smelting Company of Canada, owning the Centre Star-War Eagle group of mines; the Le Roi Mining Company, owning the Le Roi and Black Bear and operating under bond the Spitzee mine; the Le Roi No. 2, Ltd., owning the Josie and No. 1 mines; and the White Bear Mining Company, owning the White Bear mine. The letter of April 16 from the mine managers to the executive of the Rossland Miners' Union acceding to the request

for the advance above-mentioned, also intimated that no other increase would be made. It would thus be

In view of the fact that the cost of Rossland mines are low grade, containing low copper values, and, therefore, affected only by a small extent by the increased price of that metal, unless it should be carried on operations at a profit, it would be distinctly understood that in thus meeting the views of the men employed by them the signing companies had done the utmost possible, and that further requests for increased pay cannot be considered."

MIND OF OTHERS.

From the *Rossland Miner* it is learned that the reply sent to the mine managers by the executive of the Miners' Union shows that the best of feeling prevails between the mine managers and the men who are employed in and about the mines. It reads as follows:

To the Managers of the Different Mining Companies Operating Mines in and About the City of Rossland—A. G. Larson, R. H. Stewart, Paul S. Coul-drey and J. F. DeMuth:

Gentlemen—Your communication of April 16, addressed to the Executive Board of Rossland Miners' Union, re increase of wages to shovellers, carmen, ore sorters and laborers, was read at our regular meeting last evening, April 17, before a large attendance, and was most heartily applauded by all present.

In reply will say that not only is the attitude of the present managements heartily appreciated by those of the employees who have been affected within the last year by raise of wages and shorter hours, but also that you are held in the highest esteem by the entire body of men working in the camp.

And further, that it is not the intention of the Rossland Miners' Union to improve upon men who have shown such a friendly and fair spirit in dealing with the union and its members. On the contrary, will endeavour to at all times prove that we are conscious of the fact that all things have a limit, and that we realize that the members of a labour organization must use their best judgment in the transaction of their business the same as do the managements of the mines.

Thanking you for your prompt attention and fair consideration in all matters pertaining to the welfare of your employees, both the present and in the past, we have the honour of remaining,

Respectfully yours,

The Executive Board of Rossland Miners' Union, No. 38, W. F. M.

Signed on behalf of the Executive Board,

W. F. M.

In eight years, 1899-1906, British Columbia has produced more than 100,000 tons of copper, valued at \$10,000,000 and \$15,000,000. Production of gold in 1906 was 1,000,000 ounces, valued at \$10,000,000. In five years, 1894-1898, a total production of \$10,000,000 worth was obtained. In five years, 1894-1898, a total production of \$10,000,000 worth was obtained.

BOUNTIES ON IRON AND STEEL.

IRON BOUNTIES will be paid over an extended period by the Dominion Government. Early in April Hon. W. S. Fielding, minister of finance, submitted to the House of Commons the following resolution, which was adopted. It will be observed that the payment of bounties to iron and steel smelted by electricity is also authorized. The resolution reads:

Resolved,—1. That it is expedient to repeal chapter 8 of the statutes of 1899, chapter 68 of the statutes of 1903, and chapter 39 of the statutes of 1904, from and after January 1, 1907.

2. That it is expedient to provide that the Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the under-mentioned articles manufactured in Canada for consumption therein, viz.:

(a) In respect of pig iron manufactured from ore, on the proportion from Canadian ore produced during the calendar years,—

1907.....	\$2 10 per ton;
1908.....	2 10 per ton;
1909.....	1 70 per ton; and
1910.....	0 90 per ton.

(b) In respect of pig iron manufactured from ore, on the proportion from foreign ore produced during the calendar years,—

1907.....	\$1 10 per ton;
1908.....	1 10 per ton;
1909.....	0 70 per ton; and
1910.....	0 40 per ton.

(c) On puddled iron bars manufactured from pig iron made in Canada during the calendar years,—

1907.....	\$1 65 per ton;
1908.....	1 65 per ton;
1909.....	1 05 per ton; and
1910.....	0 60 per ton;

(d) In respect of rolled, round wire rods not over three-eighths of an inch in diameter, manufactured in Canada from steel produced in Canada from ingredients of which not less than fifty per cent. of the weight thereof consists of pig iron made in Canada, when sold to wire manufacturers for use or when used in making wire in their own factories in Canada, on such wire rods, made after December 31, 1906, \$6 per ton;

(e) In respect of steel ingots manufactured from ingredients of which not less than fifty per cent of the weight thereof consists of pig iron made in Canada, on such ingots made during the calendar years,

1907.....	\$1 65 per ton;
1908.....	1 65 per ton;
1909.....	1 05 per ton; and
1910.....	0 60 per ton.

3. That it is expedient to provide that no bounty shall be paid under the foregoing provisions in respect of iron or steel made in Canada by the electric process after December 31, 1908.

4. That with a view to the encouragement of the smelting of Canadian iron ore by electricity it is expedient to provide that the Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on pig iron and steel ingots manufactured in Canada, for consumption therein, when such pig iron and steel is the product of Canadian iron ores smelted in Canada by electricity, viz.:

(f) On pig iron manufactured from Canadian ore by the process of electricity smelting during the calendar years,—

1909.....	\$2 10 per ton;
1910.....	2 10 per ton;
1911.....	1 70 per ton; and
1912.....	0 90 per ton.

(g) On steel ingots manufactured by electric process direct from Canadian ore, and on steel ingots manufactured by electric process from pig iron smelted in Canada by electricity from Canadian ore during the calendar years,—

1909.....	\$1 65 per ton;
1910.....	1 65 per ton;
1911.....	1 05 per ton; and
1912.....	0 60 per ton.

5. That it is expedient to provide that bounty shall not be paid on steel ingots from which steel blooms and billets for exportation from Canada are manufactured.

6. That it is expedient to provide that the Governor in Council may make regulations to carry out the intentions of these resolutions.

7. That it is expedient to provide that the Minister of Trade and Commerce shall be charged with the administration of the foregoing provisions.

From a report of the Canadian commercial agent in London, England, lately published by the Dominion Department of Trade and Commerce, the following excerpt has been taken: "Minerals.—The fine display of the mineral resources of Canada made at international and other exhibitions where Canada has been represented have attracted a good deal of notice. We receive a number of inquiries from firms seeking supplies of particular minerals and metals which are known to exist in Canada. With the more universal appreciation of the great mineral wealth of the Dominion there is, however, an exaggerated idea as to the extent to which development has already taken place. We find many cases in which inquirers are disappointed to learn that deposits which they thought to be already worked and producing are practically untouched. In several instances where Canadians have applied to us to place them in touch with firms in this country buying particular kinds of minerals, it has subsequently turned out that they merely sought purchasers for undeveloped properties and not for the product of their mines. There is a very limited market in the United Kingdom for undeveloped mineral properties, but on the other hand, a very large trade in minerals of almost all kinds."

THE FRASER AS A DREDGING FIELD.

By H. G. Springer.

THE FRASER, as most people are aware, is one of the largest rivers in British Columbia, some 800 miles in length, flowing into the Straits of Georgia a few miles below New Westminster. The Fraser came into prominence in the early sixties, at the time of one of the great gold rushes all along its banks and in the Cariboo country. This gold rush was the commencement of a new era for British Columbia, a country which was then chiefly inhabited by Indians, or Siwash, as they are usually termed in that part. The influx of the white man, which brought civilisation to the natives, proclaimed

When the gold rush came on, and the surface of the river benches had been worked out, many of the old timers cleared land with the aid of their "hard-earned" mining gains, and have now flourishing ranches, and in the finest climate in the world; whilst others are panning out their last days in that grand institution, the Old Men's Home.

To revert to the Fraser and its gold resources—it is somewhat of an open question as to the origin of the gold deposit, although it was probably planted in the glacier period. At all events, it was deposited in the bygone days, and but little, except the very fine gold is now in motion. Each river curiously possesses its characteristic gold. That of the Thompson, chief tributary of the Fraser, is nuggety; that of Bridge River, another tributary, is heavy, and more



Iowa-Lillooet Gold Mining Company's Dredge at Lillooet.

(Gift of Douglas Cox, Vancouver, B.C.)

also their ultimate extermination; and it is probable that the red man of British Columbia who, fifty years ago, was a fine specimen of humanity, will in another decade become a race of the past. The white men who first "hit the trail" up the Fraser in the early sixties were, without exception, the finer body of men who ever left home in search of gold. At that time the country was practically inaccessible by any other route than from the Pacific Ocean, and the terrible hardships which these pioneers had to endure can only be realized by those acquainted with the country. Those days are now over, and the country has been opened up by the Canadian Pacific Railway, enabling it to be reached in 15 days from England, as against some six months in the early times.

in the form of slugs; whilst the Fraser's gold is fine and lacy. For this reason, the gold of the Fraser is easily saved when dredging. The ordinary methods being adopted to save the gold are by tables covered with cocoanut matting and expanded metal and mercury, which latter is not always necessary.

The general conditions of the Fraser, and difficulties which have to be contended with are as follows: The river possesses an abnormal rise and fall, which is influenced by the snowfall in winter and the heat in summer. The rise and fall, generally speaking, is from 25 to 50 ft.; as a rule high water occurs in June and low water in March. The river seldom remains at one level for any lengthy period, and is continually rising and falling a few inches at a time, except after winter, when the breaking away of ice jams often creates a big and sudden rise of several

*In *The Mining Journal*, London, England, March 28th, 1907.

feet. The current is usually very swift, and at high water often runs up to 15 knots an hour; but it slackens off considerably at low water. The river, in consequence of its varying currents, back eddies, bad 'rips,' and sunken rocks, is practically unnavigable for steamers, except below Yale, which is about 100

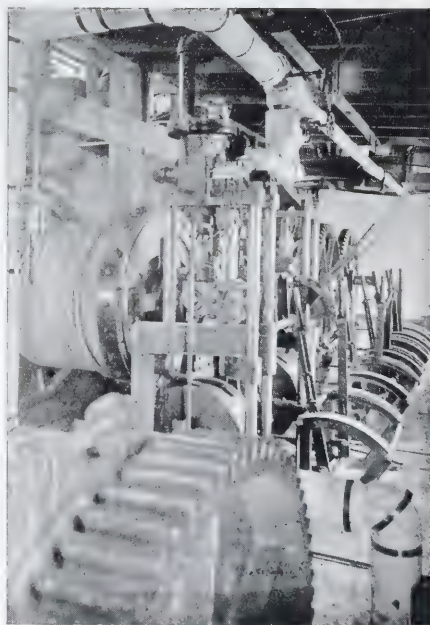


Dredge at Lillooet—Main Power Engine.

miles from the mouth. At very high water there is often considerable drift wood, rendering the crossing of boats dangerous. In the winter months there is periodically a considerable amount of heavy ice travelling, also "mush" ice, which is like rice in size, and apparently rises from the bottom of the river, and is, consequently, very difficult to guard against. This latter is a great drawback when dredging in mid-stream; it blocks the pipes and stops the pumps. The river does not naturally freeze solid from bank to bank, but in severe weather the ice sometimes jams in the narrow canyons, which arrests the travelling ice; the river becomes, in consequence, *en bloc* for several miles; one must then be on the alert for the breakaway. These are the principal dangers to contend with in dredging. The running of lines is always, of course, a source of danger in swift-running rivers, and the temperature of the water, even in summer, is not conducive to swimming.

The bars or beaches of the Fraser are all gold-bearing, and some of them are unusually large. These bars were nearly all surface worked from high to low-water level in the early days, and since re-worked by Chinamen by means of the "rocker" or "cradle," or by sluicing. It is no uncommon sight even now to see Indian women panning off gold at any time of the

year, and some good results have been obtained by these methods. The banks of the river are for the most part heavily timbered, and studded here and there with rock, which often juts right out into mid-stream. There is little or no silt in the river. The bed is paved with boulders of all sizes, and so tightly have they been packed by nature that it is very difficult to open up the ground, and nothing but the strongest machinery can be used. When the surface is broken through there is less strain, and fine gravel occasionally interspersed with boulders is struck; the best pay dirt is usually reddish or milk white in colour. Although rim rock has often been touched at the sides, I doubt if real bed rock has ever been actually struck, although dredges have worked to a depth of 40 ft. below water level. The bed of the river is at an extraordinary depth below the water level in most places, and is, in consequence, unworkable; and for this reason alone dredging operations will be confined generally to the bars or beaches; and as these mostly extend to high-water level, a dredge is sheltered from the running ice and timber, and can, in consequence, often work nearly all the year. These,



Dredge at Lillooet—Line or Warping Engine.

then, are the chief characteristics and conditions of the river.

As yet very little is known as to the Fraser's dredging qualities, as the industry has not yet begun to boom; but it will do. The want of knowledge of these conditions and the unsuitable dredges have so far kept this enterprising industry and cheapest form of

mining in the background. The chief reason why dredging has not as yet come to the fore is because the parties responsible for putting on dredgers have preferred to experiment with inferior or unsuitable machinery instead of trading on the mistake made by other people in other countries where very similar



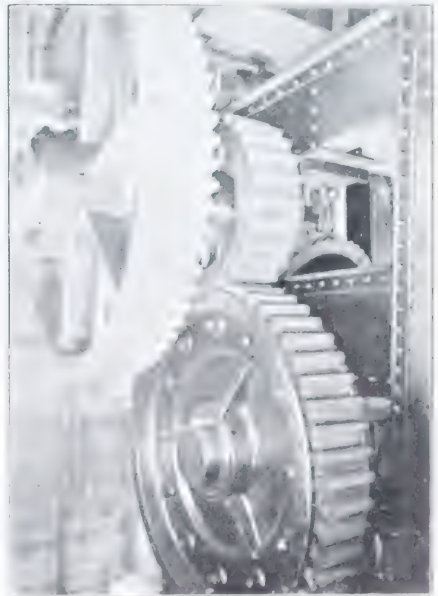
Dredge at Lillooet. 72 ft. Steel Bucket Ladder, Buckets and Engines.

dredging conditions exist, and where the industry has reached a high measure of success. I refer especially, of course, to New Zealand, where dredging has been in vogue some 40 years. If the methods adopted in New Zealand had been carefully followed in the first instance, few mistakes could have been made, less money would have been thrown away, and success attained long ere this. In some cases New Zealand crews have actually been imported, but the experience and ability of these skilled practical men has been ignored in designing further dredges. But the time has now arrived when the responsible parties are beginning to see the error of their ways, and to recognize that success depends in taking these men into their confidence.

The "dipper," "clamshell," and suction dredge were all tried without success before the bucket dredge was introduced. The first bucket dredge (by Simons) was put in at Lytton, by the Cobeldick Dredge Co., in 1898. This was in many respects a good dredge, and has merited a far better fate than it has yet met with. The buckets had a capacity of 5 cu. ft., and the machinery was good and strong throughout; the winch, in particular, was ideal, and

suited in every respect to the Fraser. The fault in this dredge was the design. It was not designed for bar working, in that it possessed neither a tailings stacker nor projecting ladder; but these were faults that might easily have been remedied. Although this dredge has been out of commission since 1904, it is still in existence, and may yet do good work.

The second dredge put on at Lytton, by the Fraser River Gold Dredging Co., in 1903, was far inferior to the Cobeldick dredge; and, although possessing a stacker and projecting ladder, the dredge was a lamentable failure on account of her lack of free-board, which made her dangerous to navigate, her want of strength, and bad design; the engines and boiler were the only redeeming features of this dredge. Although not suitable for the Fraser, she might be useful as a paddock dredge when reconstructed. She was wisely put out of commission in 1906. In 1903, also, another dredge was put on at Lillooet by the Iowa & Lillooet Dredge Co.; this dredge was a great improvement on all previous ones, although many of its parts were unsuitable, and needed reconstruction before getting into good dredging order. This dredge has now turned over a con-



Dredge at Lillooet. 72 ft. Steel Bucket Ladder, Buckets and Engines.

siderable amount of ground with good results, although the company is now in a bad fix on account of internal trouble and extravagant management.

Another dredge has recently been put on at Yale by a party of New Zealanders, who brought their dredge over from New Zealand. This is the best dredge that has as yet been put on, although perhaps

not quite up to date, and is a typical New Zealand dredge. The buckets have a capacity of 5 cu. ft.; the stacker has so far not been placed into position. There is yet another dredge to be put on at Big Bar, above Lillooet. This new company is being run on sound business lines. The ground is, first of all, being properly prospected by means of a drill. New Zealand plans are to be adopted for the dredge design, and revised to suit the working conditions of the Fraser, by New Zealanders who were originally brought over by the Fraser River Gold Dredging Co., and who, besides their New Zealand experience, have

ing; and if a 7-ft. bucket would save any, the extra running cost would be immaterial. A good dredge should run at least 120 hours a week (six days). A 7-ft. bucket dredge should have a capacity of not less than 4,000 yds. a day (24 hours), which would mean in a week of 120 hours about 20,000 yds.; but as it is probable the buckets would only average half this capacity, this would mean 10,000 yds. a week, or, in a year of 40 weeks, 400,000 yds. General running expenses, including labour, fuel, supplies, etc., should not exceed £80 a week; this would mean in a year of 40 weeks an expenditure of £3,200. To this sum



Dredge at Lillooet—Revolving Screen of Perforated Steel Plate; Length 24 ft., Diameter 5 ft.

now worked several years on the Fraser. I confidently expect great things of this company.

The main key to bring the dredging industry on the Fraser River to a success is a suitable dredge, of which the principal features must be strength and simplicity, coupled with economical management. If these lines are followed, there is no reason why dredging should not boom in a few years. Overcapitalization must be guarded against; it is unnecessary, and is apt to encourage extravagance. Twenty thousand pounds (\$100,000) capital for one dredge should be ample. A really first-class and up-to-date dredge would cost from £10,000 to £15,000, ready to run on the river. So far, 5-ft. buckets are the biggest that have been employed; but it is probable that 7-ft. buckets would handle the heavy boulders better; more material would be treated, and less time lost. Much of time has been lost in shifting from the buckets large boulders which could not be passed through the screen. Time, of course, is everything in dredg-

ing; and if a 7-ft. bucket would save any, the extra running cost would be immaterial. A good dredge should run at least 120 hours a week (six days). A 7-ft. bucket dredge should have a capacity of not less than 4,000 yds. a day (24 hours), which would mean in a week of 120 hours about 20,000 yds.; but as it is probable the buckets would only average half this capacity, this would mean 10,000 yds. a week, or, in a year of 40 weeks, 400,000 yds. General running expenses, including labour, fuel, supplies, etc., should not exceed £80 a week; this would mean in a year of 40 weeks an expenditure of £3,200. To this sum

must be added rents, taxes, etc.; also allowance must be made for overhauling and renewing at the end of the dredging year; but the whole year's expenditure should not exceed 2½d. (five cents) a yard. Now, as to the value of the ground. As mentioned previously, I think that future operations will be concentrated entirely on the bars or beaches on account of the bed of the river being at too great a depth to allow it to be successfully treated. Very little is as yet known as to the general wealth of the river and its possibilities as a dredging field, as, except by dredging in recent years, only the surface has been worked, which has yielded an enormous amount of gold. The prospecting operations by dredging in recent years have yielded good results, and have averaged as much as 1s. (25 cents) a yard, some of the ground yielding as much as 6s. a yard, but this was only in patches. The general average may be taken at about 10d. (20 cents) a yard, which is a highly satisfactory dredging proposition; and, with a dredge

treating 400,000 yds. a year, would mean a return of more than £16,000. In taking up fresh ground, its value should first be ascertained by means of a drill before putting on a dredge. The risk in this case will be small; and if it pans out anything like the same value as mentioned above, success is assured, if the enterprise is carried out on the lines above indicated.

IMPROVEMENTS IN GOLD DREDGES.

Official Notes on Progress in New Zealand.

DREDGING FOR GOLD has long been more extensively carried on in New Zealand than in any other country in the world. A departmental return for 1905 shows that there were in that year 185 dredges employed in alluvial (placer) mining in that colony. The following excerpts from the annual report of Inspecting Engineer John Hayes, F. S. Sc., to the minister of mines for New Zealand, will probably be read with interest by many to whom the practical experience of others connected with the mining for gold by means of dredges may prove of some value. As the report for 1906 has not yet been published, the most recent information available is that contained in the report for 1905, received a few weeks ago. In this Mr. Hayes says, in part:

Since my last report there have not been any developments of note nor any alterations in working conditions which call for special comment with the exception of a new method of conveying power to

the object of increasing the efficiency of the gold-saving arrangements.

It is worthy of mention that the planting of forest trees on dredged ground gives every appearance of proving a successful experiment, and also that so far as one is able to judge at present the dredging of the



Fraser River, Showing Gravel Bar in Distance.



Dredge Working on Fraser River Bar near Lillooet.

flats will not be nearly so detrimental from an agricultural or pastoral standpoint as many people imagine, but rather the reverse will hold good in some cases.

It may be interesting to note that as the result of the successful application of dredges for alluvial gold mining in New Zealand in the first instance, and more recently in several other countries, the method is to be adopted in Tasmania for the recovery of stream tin from alluvial deposits. The work of designing a number of large and powerful dredges for the purpose is in progress.

(Continued on page 140.)

During the past few years dredging for gold has been satisfactorily carried on in Otago with dredges run by water instead of steam. Where water is available at a sufficient elevation to provide motive power for a dredge, ground that would not pay expenses if the dredge were driven by steam can be made to pay well. Increased attention is now being given to water-power dredges, owing to the fact that a new and simple method of conveying the water on to the dredge has been adopted within the past six months, which method has given every satisfaction. A number of proprietaries whose properties are so situated as to enable water to be brought on to the ground to be worked are now moving in the direction of adapting their dredges to work by water power and towards discarding the steam plants which necessitate such a

dredges worked by water pressure, a description of which is given below.

As regards improvements in the construction, etc., of dredges, it may be remarked that the use of bulkheads in the pontoons for the purpose of dividing them into watertight compartments is becoming more general, and will tend to reduce the liability to sink in event of accident to the hull. Of late, experiments and additions have been made on some dredges with

large expenditure for coal and upkeep. The new method of conveying the power to the dredge was designed and adopted on the Argyle Dredge, Waikaia,



British Columbia Dredging Co.'s Bucket Dredge on Spruce Creek, Atlin—Operated by Hydro-Electric Power.

Otago, by R. T. Stewart, consulting engineer, and J. W. Stewart, dredge master and mine manager, members of the proprietary. In this instance the surface of the ground being worked is not above the level of the deck of the dredge. The water from which the motive power is derived is conveyed in an open race for a distance of 11 miles to a point 70 chains distant from the scene of operations and 170 ft. higher than the dredge. From this point the water is conveyed through 13-in. steel piping to within about two chains of the dredge, where the pipe is reduced in diameter to 9 in. and a swivel joint connected to the end of pipe line. To the other end of the swivel joint a length of 66 ft. of 9-in. piping is attached, the end of this length of piping being supported on a double-flanged trolley wheel 2 ft. 6 in. in diameter, which runs on a single rail curved to a radius of 66 ft. A second swivel joint is joined to the end of the pipe supported by the wheel, and to this is connected a length of 75 ft. of 7½-in. piping, the end of which is connected with a ball and swivel joint which is bolted to a beam on the bow of the dredge. From this point a distributing pipe 9 in. in diameter is carried along the deck to the stern of the dredge, branch pipes being taken therefrom to supply the water to the Pelton wheel, which is 4 ft. in diameter, running at 220 r.p.m. under full load and supplying power for driving all the machinery. The

water is directed on to the wheel through a deflecting nozzle having a tip of 1½ in. diameter, a hydraulic jet pump having a 2-in. jet and a 5-in. throat being used to lift water for the shoot. Its capacity is 2,600 gal. per min. to a height of 18 ft. The dynamo used for generating electric light for the dredge is also driven by water power, a ½-in. jet being used to drive a small Pelton wheel for this purpose.

The method of supporting the two long spans of piping is by a wire rope understay. The ground being worked is 30 ft. in depth and of a hard, cementy nature containing many large stones which, however, owing to the strength of the machinery and abundance of power, proves no bar to its expeditious and satisfactory treatment. The cost of running the dredge is less than £30 (\$150) per week.

The application has also been made to the Golden Beach Dredge, Alexandra, which had previously been driven by a steam plant. The use of the engine and boiler has been discarded, and water installed as the motive power, with a result in its efficiency exceeding the most sanguine expectations of the proprietary. The water is brought to the claim by a 13-in. steel pipe line a distance of more than 4,000 ft., the fall being 240 ft. The depth of ground being worked is 56 ft., the face standing 36 ft. above water level. On account of the height of the face above the deck of the dredge a tower was built of four 7-in. pipes, 33 ft. in height, stayed to the gantry by wire rope stays to prevent swaying, and bolted to the deck at foot. The water is conveyed from the main through two 80-ft. spans of 14 B.w.g. pipe, the one being 9 in. and the other 7½ in. in diameter, the latter being connected to a ball and swivel joint bolted to platform on top of tower. The water is conveyed from this point through a 9-in. distributing pipe down to gantry level, where



Hydro-Electric Power for Dredging Pressure Box and Pipe Line at Atlin.

it is tapped by a 3-in. branch supplying water to the breaking-down nozzle, this nozzle being used only when necessary to bring a fall down and to obviate the necessity of the dredge working dangerously near the face.

The Pelton wheel which drives main buckets, is 30 in. in diameter, and the dynamo is a 40-hp. screen, tailings elevator 80 ft. in length, and silt Pelton wheel with a 12-in. jet.



Hydroelectric Power Plant, showing Pelton wheel, dynamo, and tailings elevator, operated by Hydroelectric Power.

elevator, is 4 ft. in diameter working under a 11 $\frac{1}{2}$ -in. jet. The winches are driven by a reversible Pelton

The whole of the plant was designed by R. T. Stewart and erected by him personally.

THE SIMILKAMEEN DISTRICT OF BRITISH COLUMBIA.

Official Report by Charles Camsell.*

SIMILKAMEEN DISTRICT, a large area of country lying between the valley of the Fraser River on the west and the Okanagan country on the east, is a part of British Columbia that has long remained practically undeveloped by reason of lack of means of communication with markets for what it would produce under favourable conditions in this connection, and by the absence of transportation facilities requisite for the development of its minerals at a cost that would admit of mining being carried on at a profit. Its long period of waiting for these indispensable provisions for the exploitation of its varied resources on a scale in reasonable proportion to its comparatively large extent seems to at length be drawing to a close. As a consequence it has during the last year or two received more attention than at any time since the days of its placer gold mining activity. The following report by an official of the Geological Survey of Canada, relating to its geology and mineralogy, is therefore timely and will doubtless be read by many interested in the subjects dealt with. Mr. Camsell reported as follows:

The district in which the field work was this season (1906) carried out was that portion of the Similkameen mining division of British Columbia, lying about and to the south of the town of Princeton; the object being to commence a topographic and geologic survey of a sheet, which shall embrace the whole of the Similkameen district, to be eventually published on a scale of four miles to the inch with a contour interval of 200 ft. Interest in this section of southern British Columbia has been greatly increased in the last year or two by the probability of its being shortly traversed by a line of railway, if not two separate lines. Although it has long been known to contain valuable deposits of gold, silver, copper, platinum and coal, the lack of lines of communication with markets for these products prevented any extensive development of these deposits. With the advent of the railway, however, the country has a promising future, and already some of the principal claim owners are making preparations to open up their properties with a view to shipping ore in the near future.

The lack of any detailed geologic information has been a great drawback to the prospectors in the district, for up to this year no attempt had been made by this department to do much geological work since the publication of Dr. Dawson's map in 1877.**

The field work requisite for the compilation of a suitable map of the whole district must of necessity occupy several seasons, so that, to satisfy the immediate claims of the district, it was deemed best

to confine the work of this session to the more important sections where economic minerals had been discovered and mineral claims located. Commencing on the Boundary line where it crosses the Pasayton, and tying on to two prominent monuments of the Boundary survey, a skeleton triangulation was run northward to Princeton, taking in a belt five miles on either side of the Similkameen River. The mineralized areas of Roche River, Copper and Kennedy Mountain camps were connected together on this skeleton, and the geology of these camps studied more carefully than the rest of the country. The boundaries of the Tertiary coal basin about Princeton were defined, and this, with the Copper Mountain camp was plotted on a topographic map of half a mile to the inch with 100-ft. contours.

The early part of June was very wet, but no rain fell from the end of that month until early in September, so that the bush fires which started at the end of July remained unchecked for several weeks, during which the pall of smoke rendered it impossible to carry on the triangulation. For this reason the original intention of carrying the triangulation up the Tulameen River from Princeton had to be abandoned, and the important camps of Bear Creek, Boulder Creek and Champion Creek in this section were only done geologically, and not connected up with the other camps.

On May 28 I arrived at Penticton, where a pack train and outfit were obtained, and from here the journey of 75 miles to Princeton was made on horseback. The latter place was selected as headquarters for the season. Though it is quite possible to continue the field work in the eastern part of the district well on into October, operations were suspended in September, and on the 25th of that month I left Penticton for Rossland, Phoenix and Greenwood, where some days were spent in a comparative examination of their ore bodies with those which I found in the Similkameen district.

PHYSIOGRAPHY.

The Similkameen River forks at the town of Princeton, the west branch being known as the Tulameen and the south branch as the South Similkameen. Twenty miles up the South Similkameen again forks, dividing into the Pasayton and the Roche Rivers. The name, Roche River, was originally applied to a smaller branch of the stream flowing in 12 miles above the mouth of the Pasayton, but in recent years it has become customary to refer to this branch of the river as the Roche, while in reality it should retain its original name of South Similkameen.

Both the Roche and the Pasayton Rivers draw their water from the high range of mountains lying

**Dr. Dawson also spent a part of the season of 1888 in a study of the rocks of the Tulameen River, that district having come into prominence a year or two previously owing to the discovery of some very rich placers, and a short account of his observations appears in the "Summary Report of the Geological Survey" for that year.

*In "Summary Report of the Geological Survey for 1906."

on and to the south of the International Boundary line, their branches interlocking with those of the Skagit drainage, and the Methow which flows directly southward into the Columbia. The basin occupied by these two streams is enclosed between two spurs of the Cascade Range of mountains, which divide in the state of Washington, the true Cascades or Hozaameen Range forming the divide between the Roche and Skagit Rivers and running up northward to the west of the Tulameen River; while the eastern Cascades or Okanagan Range strikes slightly east of north and lies to the west of the Pasayton and Ashnola Rivers. The western of these two spurs is the more persistent and stronger range, and its summits show little or no diminution in elevation or ruggedness of relief beyond the limits of this sheet to the north. The eastern range, however, from summits at the boundary line with elevations of 8,500 ft., dwindles down north of the Similkameen River to elevations of 7,000 ft.

Taking as a central point the town of Princeton, the elevation of which above sea level has been variously estimated at from 1,885 to 2,120 ft., and which lies in a shallow depression occupied by Tertiary sedimentary rocks, there is a marked rise in the slope of the lines radiating to the west, south and east, while the gradient to the north is almost imperceptible. In this curve the hills have all been worn down below the limit of intense alpine erosion and appear as rounded ridges and dome-shaped summits of gradually increasing elevation towards the circumference. Only towards the periphery of this curve do the summits attain an elevation greater than the tree line, which in this district is approximately 7,000 ft. above sea level, but except in the immediate vicinity of Princeton these are usually well wooded with spruce, pine, balsam and tamarack. This rounded outline and regularity of form, while in the main due to erosion, is also in part the result of the filling in of old irregularities of the surface by the Tertiary lava flows which still cover such a large proportion of the surface. Glacial action—the action of erosion as well as deposition—has also been instrumental in reducing the vertical relief.

Many evidences of recent development in the topography occur. The South Similkameen, from the Pasayton to Whipsaw Creek occupies a deep narrow V-shaped valley indicative of a comparatively recent uplift, which imparts to this portion of the stream increased vigour and power of erosion. The valley of the Tulameen also, above Otter Creek, as well as many of its tributaries, is narrow and steep, showing that the drainage has not been very long in operation since the change in elevation.

Numbers of terraces and deposits of gravel also occur at various elevations to a height of 1,100 ft. above the present level of the lowest ones. As a rule the higher of these only now occur as small remnants of more extensive terraces, formed in the period immediately following on the disappearance of the Cordilleran glacier, and which have since been reduced in size by the ordinary atmospheric agencies

of erosion, so that the remains of the old terraces now far below them. These are the most apparent evidences of comparatively recent changes of level.

Accompanying the changes of level and either a direct result of them, or of the blocking of ancient channels by recent volcanic flows, have been some striking changes of drainage. The most marked instance of this is the deep wide valley of Wolf Creek, now occupied by a stream in contrast with the size of the valley. It seems probable that this valley, with its continuation through Swelter Lake, once carried a great part of the drainage of the Similkameen River which now flows through the Tertiary basin about Princeton. All the smaller streams entering the south side of this valley occupy hanging valleys, so that they debouch in waterfalls, or have been forced to cut deep canyons down to the level of the trunk valley.

GLACIATION.

During the glacial period the Cordilleran glacier covered all the summits north of the Boundary line in this belt. The results, however, show that the glacier was losing its great power of erosion and was rather depositing its load. This is evidenced by the small number of grooved and striated rock exposures, and by the thick deposit of rock detritus on the summits of the hills as well as in the valleys. Prospecting for mineral deposits on this account becomes more difficult than in a region where the strength of glacial erosion had been greater. At present no glaciers occur in the belt between the Boundary line and Princeton. Many of the highest summits, however, at the Boundary line, have beautiful glacial cirques carved out of the solid rock on the sides facing the north. These usually have small lakes in the bottom filled with water drawn from the snow, which lies on the sides and rims of the cirques until well on into the middle of the summer.

Though glacial material is widespread, boulder clay is rarely observed. Terraces of gravel and sand and some beds of clay are frequently found adhering to the sides of the main valleys.

Hanging valleys have already been referred to as occurring on Wolf Creek, and also on the Tulameen River above Otter Creek.

The thick deposit of glacial drift, though a hindrance to the speedy development of the mineral resources of the district, must be reckoned as a part of its economic resources in that it has produced a considerable extent of excellent farm and grazing land, which could be made to support a much larger population than it now holds.

SOILS AND CLIMATE.

Geological work on the Similkameen becomes very difficult on account of the great variety and complexity of the rock formations, also the thickness and widespread covering of drift. Plutonic, volcanic and sedimentary rocks are all present covering a period from Palaeozoic to later Tertiary times. Fossils occur in the Tertiary lignite basin about Princeton, and in the Cretaceous sandstones of the Roche River, but

the remaining sedimentary rocks—limestone, argillite and quartzite—are either unfossiliferous or so badly crushed as to destroy any remnant of animal

except on the trails cut by prospectors through the bush. The latter difficulty, however, does not hold in the northern half, where access can usually be ob-



Valley of Similkameen River at Hedley, Where is Located the Daly Reduction Company's 40-Stamp Mill, Operated by Water-Power, and Treating Gold Ore from Nickel Plate Mine.

life they ever contained. Contacts between the igneous and sedimentary rocks are rarely exposed, so that it is difficult and often impossible to establish geological relations. Added to this is the difficulty, in the southern half of the belt, of travelling anywhere

tained to any part whether there is a trail or not. The geological boundaries that have been traced, then, and the ages in which the different rocks have been placed, are tentative and will be subject to revision at a later date.

The formations met with and their approximate or relative ages are as follows:
Glacial and Recent Deposits.—

Tertiary.—Volcanic flows, basalts, andesites, etc., intrusive sheets and dykes, sandstones, shales, clays and lignite beds.

Cretaceous.—Argillaceous sandstones, grits, conglomerates and slates.

Jurassic or Triassic?—Granodiorite and other batholithic intrusions, porphyrites, tuffs and breccias?

Palaeozoic.—Limestones, argillites and quartzites, green, spotted and chloritic schists, talc and graphitic schists, mica and hornblende schists, with some limestone and silicious bands.

The oldest rocks of the district are the Roche River schists, which cover an area about the junction of Roche and Pasayton Rivers. This area extends from the canyon below the junction of the two streams four miles up Roche River, and to a point eight miles up the Pasayton, its southern contact on the latter stream being the batholithic intrusion of Rammel granodiorite; while on the Roche River it is in contact with a band of syenite gneiss. On all other sides the schists are overlain by recent volcanic rocks lying a short distance back from the river banks. The schists are very varied in character. On the south are micaceous and hornblende schists frequently very silicious and becoming gneissic, and holding some bands of greyish crystalline limestone. The northern part of the area is occupied by soft green, spotted and chloritic schists, with smaller bands of graphitic and talc schists, the latter being frequently mineralized and traversed by quartz-filled fissures. It has been impossible to determine the age of these rocks, and though they have some lithological resemblance to the Archaean of the Shuswap series, they may also be only very highly metamorphosed sedimentaries and porphyrites as found in other parts of the district to the north.

The limestones, quartzites and argillites cover a very limited area, but are important as occurring with some of the ore bodies in the southern part of Copper Mountain. They also form a highly-altered and metamorphosed band crossing the Similkameen River below Allison, and lying between or under young volcanics on the west, and the great mass of granite on the east. They also extend some distance south of Copper Mountain until they are covered by Tertiary volcanics. They appear to resemble closely the Cache Creek series of the Kamloops district. They have been cut and greatly disturbed by later intrusions of igneous rock, and so much of these beds has been destroyed that they now frequently appear only as islands or "roof pendants" in batholithic masses of rock. The limestone is often white and crystalline, and the argillites and quartzites are highly altered, and in many cases have probably taken on a crystalline structure. In addition to the metamorphism they have undergone some fracturing, and become brecciated. Much of these sedimentaries is

probably covered by volcanic flows, and much has been digested and assimilated by eruptive masses of plutonic rocks. The parts that remain are only remnants of once extensive sediments that covered a great part of southern British Columbia.

A small area of green porphyrites, tuffs and conglomerate occurs in the bottom of the valley of Sunday Creek. These are shown in the bed of the stream as cutting through the enclosing parts of the limestones and argillites. They are so intimately associated with volcanic rocks, which are of undoubted Tertiary age, that it is very often difficult to separate the two, and for the present, or until they have been studied in more detail, all that can be said with regard to their age is that they are later than the limestones and older than the Tertiary. The porphyrite is much weathered and decomposed on the surface and appears to be an augite-porphphyrite. The tuff and conglomerate are greenish in colour and consist of rounded pebbles of earlier volcanic rocks. They also contain some fragments of fossil wood.

Batholithic Intrusions.—Under this head are classed the Rammel granodiorite of the Pasayton River, the syenite and syenitic gneiss of the Roche River, and the igneous complex of the Copper Mountain. The Rammel granodiorite is cut across by the Pasayton River and extends northward from the Boundary line for a distance of four miles to its contact with the mica schist. South of it is a large area of Cretaceous rocks. The typical rock of this area is composed of hornblende, biotite, quartz and orthoclase feldspar. On the same strike of the Rammel granodiorite on the Roche River is a band of syenite and syenitic gneiss about two miles wide. This is not so coarsely crystalline and is so much more basic in composition as to be almost a diorite, but it is possible the two may have been produced from the same magma.

The composition of the igneous complex of Copper Mountain is variable, ranging from silicious in the north and west to a more basic variety in the south and east. The typical rock is hornblende diorite. This is best developed in the south and east, where it has not been affected by mineralizers or altered by later igneous intrusions. In places where this is in contact with some remnants of the older sedimentaries, a gneissic structure has been induced in it. To the centre and north it has been fractured and brecciated, and is now traversed by many little veins of calcite-magnetite and feldspar. The rock has also become finer in grain. Large crystals of biotite are often developed in the zone of fracture. The contact between the diorite and the sedimentaries is very irregular whenever exposed. It is rarely sharply defined and in many cases no definite boundary can be seen.

many different types of dykes, with which it becomes intimately mixed, that it is often difficult in the field to separate the different intrusions.

Lower Cretaceous.—These rocks cover a wide area in the southwest corner of the district. They appear on the Pasayton River just west of the Boundary

line and striking about 330 deg., cross Roche River about six miles above the junction of that stream with the Pasayton. At both these places they are seen to overlie the eruptive rocks. The beds consist of hard sandstones and grits, interbedded with black and red argillaceous slates, all of which appear to have suffered much stress and pressure, for the angles of dip are now all high, being usually about 50 deg. On the Roche River the bottom bed is a conglomerate, which rests directly on the syenite to the north of it.

Tertiary.—The remaining rocks are all of Tertiary age; and, grouping the sedimentary rocks with the volcanic, it is found they cover the largest proportion of the district. The sedimentary rocks alone in the northern part of the district cover an area of nearly 50 sq. miles—the basin being 14 miles long with a variable width of from three to five and one-half miles. These sedimentary rocks consist of thick beds of sandstone, with clay, shales and several seams of coal. The base of the series appears to be a coarse-grained sandstone containing many large rounded white feldspars in a matrix of calcareous material. This rests, on the eastern side of the basin, on the Copper Mountain series of rocks; while on nearly all other boundaries, the sediments dip under the more recent volcanic rocks, which lie as sheets on them. In parts, also, these volcanics have thrust themselves through the sediments and now appear as islands in the older rocks. The strata do not now lie horizontally, but have been tilted at low angles, making an irregular series of folds. Some faults also occur.

Many drill holes have been bored in this Tertiary basin in search of coal seams, and with some good results. Most of them, however, were put down at or near the edge of the seam and only one near the western edge of the basin. By the kindness of Mr. Ernest Waterman, manager of the Vermilion Forks Mining and Development Company, copies of the records of these drills have been obtained. These have disclosed the thickest coal seams to be in the vicinity of the town of Princeton, where a bed more than 18 ft. in thickness was struck at a depth of 49 ft. The hole, in which this seam was found, was sunk near the bridge over the Similkameen River to a depth of 280 ft. In this hole coal seams aggregating 35 ft. 7 in. were crossed in the first 90 ft., while the rest was in shales and sandstones. Four miles up the Similkameen River a bore hole sunk to a depth of 257 ft. only went through 2 ft. 5 in. of coal; while a drill hole near the south end of the basin at Ashola, which penetrated to a depth of 398 ft., gave no workable seam at all, and only a few bands of what is called in the record "coaly shale."

A bore hole was also drilled near the western edge of the basin, where the sediments dip under the volcanics, and not far from where there is an outcrop of coal 4 ft. thick. The depth of the hole is 863 ft., and in that distance 17 seams of coal were cut through with an aggregate thickness of 50 ft. 6 in., of which the thickest seam was 9 ft.

From a study of these records it would appear that

most, though not all, of the workable seams are within 300 ft. of the surface. It must be noted, however, that no prospecting by drilling has been done north of the Similkameen River, yet the basin undoubtedly extends as far north at least as the forks of One-mile Creek.

Coal outcrops in many places both on the Similkameen and Tulameen Rivers, also on Summers Creek, Bromley Creek and Nine-mile. At the last-named place a cut in the bank made by the stream discloses a bed 15 ft. in thickness of fairly clean coal, with five thin partings of clay, all resting on white clay.

A sample from the big seam at Princeton worked by the Vermilion Forks Mining Company was sent to Mr. Hoffmann of the Survey department. He calls it a lignite, but one of the better class. Analysis by fast coking gave:

	Per cent.
Hygroscopic water	16.17
Volatile combustible matter.....	37.58
Fixed carbon	41.67
Ash	4.58
	<hr/>
	100.00
	<hr/>
Coke per cent.	46.25

Character of coke, pulverulent; colour of ash, brownish-yellow.

Though the age of these beds is put down as the same as the Coldwater group of the Nicola Valley in which coal occurs, there is a difference in the quality of the fuel contained in each. The Nicola coal is considerably higher in fixed carbon and lower in water, but the amount of ash is also higher. Some of the beds of the Princeton coal basin are only in a primary stage of formation, and they still show the brown woody fibre of the slightly altered vegetable remains. Some also have been completely destroyed by combustion, and it is to the combustion of an underlying bed of lignite that Dr. Dawson attributed the metamorphism and colour of the rocks at the Vermilion bluffs.

The volcanic rocks of Tertiary age have a wide distribution, and prove that this part of the country was the scene of tremendous volcanic activity during that period. Their area must have been considerably diminished during the Glacial period, so that the present distribution cannot be taken as indicative of their original extent. These are the youngest rocks in the district, for they are seen in the Tulameen River, also on One-mile and Summers Creeks, to rest on the rocks of the coal series. On the Tulameen River the stream cuts through beds of clay and sandstone overlain by these volcanics for a distance of at least two and one-half miles. The schists of the Roche River are overlain to the north and east by these volcanics, which also overlie the Copper Mountain series on the north and west. They consist of rhyolites and trachytes, andesites, basalt, tuffs and breccias. The darker lavas are often amygdaloidal, the vesicles being filled with chert, chalcedony or

zeolites. Some agates and wood opal were found in the volcanic area east of Coldwater Creek.

Some of the dykes cutting the Copper Mountain rocks appear to be contemporaneous with these volcanic rocks, and in some way connected with them.

ORE DEPOSITS.

In the Roche River district the mineralized area is confined to a belt of soft talc, chloritic and hornblende schists, lying about the junction of the Roche with the Pasayton River. The ore bodies are of two classes: (1) Small gold-bearing fissure veins; (2) larger bedded veins, copper-bearing. The first are usually quartz veins from 3 in. to 4 ft. in width, cut-

Red Star and Anaconda claims. On these there is a belt of soft talc and chloritic schist about 400 ft. wide, striking 125 deg. dipping vertically, and lying between mica schists. It appears to be traversed by a fault plane, along which bunches and lenses of white feldspar and quartz were found, and which were first worked for their gold content. On development the vein ran into the talc schist, which proved to be highly mineralized with copper carbonates and cuprite, and which was farther on replaced by bornite and chalcopyrite. With these were pyrite and arsenopyrite, siderite and some blende. A shaft has been sunk from the tunnel to a depth of 60 ft., but this



Valley of Tulameen River in Similkameen District.

ting across the strike of the schists, and dipping at angles from 60 to 90 deg. Beside gold, they carry bornite, tetrahedrite, chalcopyrite and pyrite. Sylvanite was also reported to occur, but an assay of a selected sample of one of the veins supposed to carry this mineral gave no trace of tellurium. The second class contains larger ore bodies, lying parallel to the strike of the schists. These may be either quartz veins or mineralized bands in the schists. These carry some gold, and copper and iron sulphides. The highest values are in copper.

Only two claims have been Crown-granted and surveyed, and the amount of development work done on all of them is not sufficient to prove the ore bodies, or test their permanence. The surveyed claims are the Pasayton and the Sailor Jack. On both these are small fissures, on the Pasayton one 4 in. wide, from which the samples were taken to test for tellurides, and on the Sailor Jack one 2 ft. wide cutting across a hornblende schist.

The greatest amount of work has been done on the

had to be abandoned on account of the gases. Some native copper occurs as sheets in little slips and fault planes in the schist.

Several other claims have been staked in this district, and though there are some indications of high-grade ore occurring, the only work done on them has been just sufficient to enable the Copper Mountain owners to hold their claim.

Copper Mountain was reported on by Mr. W. F. Robertson, provincial mineralogist, in August, 1901, and his report appears in the "Annual Report of the Minister of Mines for British Columbia" of that year. Since then development work has been extended farther to the eastward, but little more has been done in the neighbourhood of the river. In speaking of Copper Mountain camp and Copper Mountain ore bodies, it will be distinctly understood that Kennedy Mountain will be included as well, for no distinction can be drawn between the two.

The camp includes about 130 Crown-granted mineral claims, covering an area five miles long from east

to west, and about four miles from north to south. Combination camp lies to the south of Copper Mountain, but the ore bodies are much the same in character.

The country rock is a batholithic intrusion of igneous rock of very variable composition, which has been intruded into and has almost entirely digested the older overlying sediments—limestones, argillites and quartzites—so that these only now appear as inclusions or remnants in the igneous rock. To the north and west it is overlain by recent volcanic rocks. Along the southern and eastern border of the mineralized area the igneous rock is a diorite, which sometimes has a gneissic structure, and which frequently holds segregations of the dark minerals. To the north this rock becomes more acid, and is cut by narrow veins of pink feldspar and quartz. Both the sediments and the igneous rock are intimately mixed with, and cut by later dykes of different ages, the sequence of which cannot yet be perfectly worked out. These dykes have a general north and south trend and are quartz-porphry, rhyolite, andesite, felsite and diabase, of which the first-mentioned are apparently the most recent. The whole series, except the later dykes, is traversed by a set of fracture and fault planes running in an almost east and west direction.

Two classes of ore bodies have been made out—(1) those occurring at or near the contact of the sediments with an igneous rock; and (2) those occurring in the zones of fracture. Both are of a very indefinite character without well-defined boundaries. Examples of the first class are found at the southern end of Copper Mountain, and on the west side of the Similkameen River. In this class ore bodies are frequently found at the contact of the diorite with a limestone, which may be much altered. The ore here generally occurs as infiltrations in the small fracture planes with which the rock is traversed. The fissures cut the igneous as well as the sedimentary rocks, and the metallic sulphides are found in both, but only in the neighbourhood of the contact. The fissures have been filled with secondary calcite which acts as the gangue of the sulphides. Rhyolite and quartz-porphry dykes cut both kinds of rock, and have apparently been injected after the fracturing and fissuring had ceased, for they are not themselves affected by any such dynamic action. The intruded rock alone has been fissured to allow of the flow of mineralized solutions. These dykes are not in themselves mineralized, and do not appear to have had anything to do with the formation of the ore bodies. In the Jeannie Silkman claim a highly-mineralized diabase dyke, which cuts an altered sedimentary rock along with a quartz-porphry, seems to be responsible for the formation of the ore. The minerals occurring in this class are chalcopyrite, pyrite, bornite and calcite with a little magnetite. Bornite is confined to the southern portion of the camp. The Sunset, Helen H. Gardner, Jennie Silkman and Copper Farm claims are examples of this class.

The second class of ore bodies occurs in the centre of Copper Mountain and eastward across Wolf Creek.

In this case the ore occupies a zone of fracturing, which strikes about N. 75 deg. E. It often happens that the country rock has been brecciated and the fragments cemented together by calcite, or it is traversed by a net-work of small calcite veins with a N. 75 deg. E. trend. These fissures are most abundant about the middle of the mineralized area, and die out to the north and south. They sometimes attain a width of 2 ft., but are more often only an inch or two. They cut all the rocks except some of the later dykes. These dykes strike at right angles to the course of the fissures, cutting off the ore bodies, and do not seem to have been affected by any strains or stresses, except those which are consequent on the coaling of an igneous body. Pyrite, chalcopyrite, mispickel and magnetite occur in the calcite veins. Magnetite sometimes replaces the calcite altogether in the veins and forms the gangue for the other minerals. The Triangle Fraction, Red Eagle, Ada B., Frisco and other claims running east and west across the middle of the camp are examples of this class. In the northern part of the district the little fissures are filled with feldspar, quartz, or magnetite, to the entire exclusion of calcite.

Besides being concentrated in the zones of fracture, the copper and iron sulphides appear often to be original constituents of the country rock, for they appear as idiomorphic crystals disseminated through it without any connection with each other; and until a great deal more work is done on the claims it will be difficult to give a correct history of the formation of the ore bodies. At present not many claims have been explored to a depth lower than the limit of surface oxidation, but it may be possible to throw more light on the origin of the ore bodies, when the numerous samples obtained have been thoroughly examined under the microscope.

Owing to the nature of the occurrence of the ore on Copper Mountain it is a difficult matter to make estimates of the average values that the rock would give on assay. The ore bodies have no definite boundaries, in fact the whole mountain is more or less mineralized, with concentration taking place along certain lines, and what is classed as ore today may be too low grade to give a profit tomorrow, depending altogether on the price of copper and the cost of mining. The boundaries then will be merely commercial ones. Mr. W. F. Robertson made assays of samples from many of the different claims in 1901, and the results he obtained were from 1.5 to 3 per cent. in copper of average samples, with selected samples going up to 8 per cent. Most of them carried a small amount in gold. It will be seen by this that these ore bodies are very low grade, but this is compensated for by their great size and the ease with which they can be worked.

In the country lying between One-mile and Five-mile Creeks, and on the slope of Five-mile Creek, several claims have been located, but only the western portion of this area came within that examined. The United Empire group, consisting of nine claims, is on Allison Mountain, and occurs in the same series

of metamorphosed sediments as found on Kennedy Mountain. The whole hill is heavily covered with wash and the rock wherever exposed is decomposed to a much greater extent than in any other part of the country, due perhaps to a covering of volcanic flows during the Glacial period, which prevented the decomposed rock from being removed by the scouring action of the glacier. At the base of the hill is a thick deposit of clay and detritus washed down from the hill: it is heavily charged with copper carbonate which has probably been derived from the leaching out of a quartz vein higher up the hill carrying the sulphides of copper. Evidence in support of this is obtained from a shaft 40 ft. deep, sunk about halfway up the hill, at the bottom of which blocks of quartz carrying chalcopryite occur in the decomposed rock. It is probable there is a vein of quartz carrying copper sulphides at this place, but not enough work has been done to demonstrate the size of the vein or its strike. Surface indications, however, point to its having an east and west strike across the strike of the fracture planes on Copper Mountain.

BEAR CREEK.

At the end of the season a hurried reconnaissance was made of a mineralized belt of rocks running from the Tulameen River at Champion Creek northward past the head of Bear Creek to the Coldwater River. Some promising mining properties are being exploited in this region, and this belt of rock well warrants a more extended study next year.

Briefly stated, the geological conditions are as follows: Stretching across in a northerly direction from the mouth of Champion Creek to the head of the Coldwater is a belt of light-coloured granite. In contact with this on the east side is a series of metamorphosed sediments, limestone, quartzite and schists, extending from Coldwater River to Fish Lakes. From Fish Lakes to the forks of Eagle Creek the granite is in contact with a dyke-like mass of peridotite one mile to two miles wide, which then strikes southeasterly at a sharp angle with the strike of the granite. In this angle between the granite and the peridotite is another small area of quartzite, limestone and mica schist, which extends south to the Tulameen River and terminates at Champion Creek. Bordering the peridotite and schists on the east is a large body of pyroxenite, which extends from the falls on Bear Creek, where the wagon road crosses it, southward across the Tulameen River, where it comes in contact with granite. The pyroxenite is succeeded on the east by enormous masses of volcanic rocks, which have undergone considerable metamorphism, and are earlier in age than those volcanic rocks previously referred to in this report as occurring on the Similkameen River. Dykes of diabase, quartz-porphyry, granite-porphyry and rhyolite cut all the other rocks, and consequently are later in origin.

Contacts between the granite and schists, between the granite and peridotite, and between the schists and peridotite and pyroxenite, were discovered and studied in the field, and from these geological relations were worked out. The schists which are prob-

ably metamorphosed limestones and quartzites are the oldest rocks in the district, for they are cut by all the others and are found as inclusions in the granite and peridotite. Next in age comes the peridotite, and with this must be included the pyroxenite, though the latter is slightly the younger, for on Eagle Creek dykes of pyroxenite were found cutting the peridotite. Prof. J. F. Kemp (of Columbia University, New York), who examined the district in 1900, reported similar conditions on the south side of the Tulameen. The next rock in sequence is the large batholithic mass of granite lying to the west. Contacts between this and the older rocks are well shown on Tulameen River and Eagle Creek. Following the granite intrusion are the sheared and metamorphosed volcanic flows, and later again are the dykes which have penetrated all the preceding rocks.

Mineral claims have been located all along this granite contact, from Champion Creek across to Coldwater River, and for many years the placers of Tulameen River and its tributaries below Champion Creek have been profitably worked for gold and platinum. These placers are being gradually exhausted, and Tulameen River from being the principal producer of platinum on the North American continent, now supplies an annual output of only 30 or 40 oz. of that metal. Mining activity, however, is being revived and the production from lode mining will probably soon be far greater than it was in the best days of the placer miner.

Most of the mineral claims have been located in the area of schists, limestones and quartzites, and some in the peridotite and pyroxenite belt. The metals for which they have been staked are gold, silver and copper; and the minerals occurring are pyrrhotite, pyrite, galena, chalcopryite and calcite, with some zinc blende and molybdenite.

Molybdenite is found in several places along the granite contact. At Independent camp at the head of Coldwater River it occurs in fine scales in the large porphyry dyke, and at Champion Creek it is found in little quartz stringers cutting the schists and at near the contact with the granite.

Among the most promising claims in the district are the St. Lawrence group, owned by the Similkameen Mining and Smelting Company, of Vancouver, B. C. These were located in the fall of 1900 by a party of Swedes, and are situated on the western side of Bear Creek, and on the contact of the granite with the schists and limestones. The schists are mica schists and enclose narrow bands of white crystalline limestone. They dip at about 65 deg. towards the granite, and are cut by some large and highly-mineralized dykes of granite-porphyry, which have a north and south trend approximately parallel to the trend of the granite. The ore is always found associated with the limestone, and frequently replaces the lime bands entirely. The granite-porphyry dykes appear to be the source of the ore. The limestone bands, being the most soluble rocks, have acted as channels for mineralized solutions emanating from the dykes, and have become at times entirely replaced

by sulphides. These solutions ascending from below, and following the lime bands have deposited their sulphides against the mica schists, which always act as a hanging wall to the vein. Two veins have been opened up on this group, each of them from 7 to 8 ft. wide, and the ore in them appears to be almost pure pyrrhotite. The values are high in copper, gold and silver, and altogether the property gives promise of developing into a permanent producing mine.

Another important group of claims is the Independent, owned by Johnson, Holmes & Henning, and situated on the summit of the divide between Bear Creek and Coldwater River. This group is also on the contact of the granite body with mica schists. Here the ore body is a highly-mineralized zone of rock extending from the edge of the schists about 1,000 ft. westward into the granite. Some 2,000 ft. away from the schists the granite becomes gneissic, though still holding inclusions of the mica schists. No sharp line of contact could be discovered between the ore body and the unaltered granite, only that the mineralization by sulphides seems to gradually decrease until at 1,200 ft. away from the schist it disappears. The ore body is highly altered and kaolinized, where mineralization is greatest, and it appears to be of the nature of a dyke of granite-porphry intruded between the schists and the granite, though it is possible it may only be a mineralization and alteration of the same granite at and near the contact with the schists. Inclusions of mica schist occur in the unaltered granite as well as in the ore body. The greatest alteration is about the centre of the mineralized zone, where a small vein of pure iron and copper sulphides cuts the porphyry at an angle of 45 deg. The feldspar here is kaolinized, though the quartz is unaltered, and some secondary calcite has been developed. Mineralization throughout the body of the porphyry is usually by individual crystals of iron and copper pyrites, more rarely by veins and bunches of these minerals. Only in the highly-altered zone does oxidation extend to a depth of 20 ft. from the surface. Some molybdenite occurs in thin seams and flakes near the contact with the mica schist. The values are entirely in copper and are low, but the ore body is an enormous one. The group consists of 10 claims, which have all been staked on the same contact, running down into the Coldwater River.

Numerous other claims were visited in this section of country, among them being the Keruna group on Bear Creek, and Boulder Creek camp east of Bear Creek. The former lies in the same series of altered sedimentary rocks as were described on the St. Lawrence group. These are cut by dykes of a porphyritic character which strike about 330 deg. The ore occurs as little veins and bunches in the sediments at and near the contact of the dykes. The minerals found are pyrite, chalcopyrite and pyrrhotite, and the values are in gold and silver.

At Boulder Creek the claims are located in a soft green serpentine, which often has a schistose structure developed in it, and which appears to be an altered volcanic rock. The ore bodies are in blanket

veins interbedded with the country rock, and the minerals occurring are pyrite, chalcopyrite and some galeua. The values are in gold, or copper, or both, the one increasing as the other decreases.

Owing to the enormous rise in the price of platinum in the last year, and to the fact that the basin of the Tulameen River once produced a larger amount of platinum than any other part of North America, it is probable that attempts will again be made by interested parties in the near future to locate the source of the metal in this district, or to work some of the higher bench deposits of gravel which are known to carry platinum, but which formerly necessitated too large an outlay of capital to work. Prof. Kemp spent about three months of the summer of 1900 in investigating the geology of the platinum, and though not successful to the extent of finding any large bodies of rock which could be profitably mined for platinum, was able to throw a great deal of light on the origin and occurrence of the metal. His results are embodied in Bulletin 193, of the United States Geological Survey.

The Tulameen section of the country presents many more difficulties to the prospector than the Similkameen country. The former is very heavily timbered, and trails are few and rough. Rock exposures, however, are more common, except where the country is underlain by the schists and limestones, as in the upper parts of Bear Creek. Here the growth of timber is heavier than usual, and the country is so heavily covered with drift that rock exposures rarely occur, and it has only been by much labour that ore bodies have been located. Conditions for the formation of ore bodies are so favourable, though, that other important discoveries are to be expected.

Wolframite occurring in quartzite overlying gold-bearing conglomerates at Lead City, South Dakota, U. S. A., states the *Mining and Scientific Press* of San Francisco, was first recognized by an amateur mineral collector, who was a teacher in the High School at Lead. He properly determined the black granular ore to be wolframite. Miners had for 20 years thrown it away, thinking it was only an ordinary iron ore.

Concerning platinum the *San Francisco Mining and Scientific Press* says: All the platinum that has ever been produced from all countries of the globe, since the first discovery of the metal, would barely exceed 100 tons of the fine metal. You could put all, in a single block, in a room 10 metres cube. The largest nugget of platinum ever found weighed 9½ kilos—about 20 lb. Never in its history was there so great a demand for platinum as today, yet, with the mining world keenly alive to its importance, with its double-the-price-of-gold present-day incentive, with experts searching for it here and there the world over, and mine-owners urging the output "to the limit," still the annual platinum "crop" of the globe barely touches half-a-dozen tons. Three decades ago the value of platinum was \$2 per oz. Today it is above \$32.

THE SPITZEE MINE AT ROSSLAND.

Property Recently Bonded by Le Roi Mining Co.

MINING AT ROSSLAND will probably be long be extended over a wider area of the camp than that in which operations have been in progress during recent months. Work is to be resumed on the Jumbo and as well on the consolidated California-Giant properties; while on the Spitzee the Le Roi Mining Co., Ltd., which recently bonded this promising property, has already placed a working force. Concerning the last-named mine, the *Rossland Miner* a few weeks ago gave the following information:

"The Le Roi Mining Co., Ltd., has taken an option on the group of claims owned by the Spitzee Gold Mines, Ltd., located in the southwestern portion of the city limits and having an area of 110 acres. The Le Roi already owns the Le Roi and Black Bear claims, and some fractions and, with the Spitzee, will control about 210 acres of the most promising mining areas in the Trail Creek mining division. The Spitzee has sent 6,000 to 7,000 tons of ore to the smelter and is considered, in conjunction with the other properties of the Spitzee Co., to have the makings of a valuable mine. It is the intention of the Le Roi Mining Co. to at once begin work on the property acquired under the option with a good sized force of men, under the superintendence of A. G. Larson. Compressed air will be conveyed in a pipeline from the Le Roi air compressor at the Black Bear power house. The plans for machinery and development have not yet been decided on.

"The tendency in this and other camps in Kootenay and Yale districts is in the direction of consolidation and the acquisition of large areas of mining territory, so that mining can be carried on on a large and comprehensive scale, so the Le Roi Co. in this deal is but following the prevailing custom. It gives renewed confidence in the camp and its future to see companies like the Le Roi, the Consolidated Mining and Smelting Co. and the Le Roi No. 2, Ltd., acquiring adjacent properties, as it shows that they have faith in the future and expect to realize profits by their purchasing these properties or they would not be troubled with them. A. J. McMillan, the managing director of the Le Roi, is a far-seeing man, knows Rossland camp like a book, and it is almost certain he will make the Spitzee group yield a large profit to the shareholders of the Le Roi Mining Co. The addition of the number of men who will be employed on the Spitzee group means considerable in Rossland, which is now moving along with rapid strides towards a largely increased prosperity.

HISTORY OF SPITZEE GROUP.

"The ore shoot on the Spitzee was exposed when the Canadian Pacific Railway Co. changed the gauge of the Columbia and Western railway from narrow to broad gauge. It was necessary to make a new cutting at that point when the work was done, and this exposed a large ore shoot. Kenneth Bur-

nett, provincial land surveyor, staked the Spitzee fraction, in which there were 14 acres. This was in 1899. Ernest Kennedy, mining promoter and broker, formed a syndicate and bought it from Mr. Burnett, paying on behalf of the syndicate \$6,000 for it. The syndicate acquired the charter of the Indian Chief Mining Co. and began to sell stock. George Pfunder was appointed superintendent, and under his direction a shaft was sunk on the property to a depth of 50 ft. At about the time the shaft had reached this depth the mining boom collapsed, and, as the company was unable to sell shares, work was ceased and the mine was shut down for a couple of years. F. A. Hewer, the president of the Indian Chief Mining Co., and a member of the original syndicate and of the firm of Marsh, Hewer & Masters, went to the workings of the Spitzee one day and sampled the ore shoot and had the ore assayed. He showed the assay certificates to A. S. Goodeve, and they agreed to extract and ship a carload of the ore, which was done. The smelter returns were so satisfactory that Mr. Goodeve called a meeting of the Indian Chief Mining Co. and offered \$6,000 for all the treasury stock, provided the amount was expended in development work. The offer was accepted and the Spitzee was placed under the superintendence of Alexander Sharp, M. E., now the mining expert of P. Burns & Co. After considerable work had been done under the direction of Mr. Sharp, Bernard McDonald, then in charge of the Le Roi, made an expert examination of the property, and recommended the acquisition of the adjoining properties. The company was then re-organized under the name of the Spitzee Gold Mines, Ltd., and Mr. Hewer was sent to England for the purpose of raising funds with which to purchase the adjoining properties, and successfully carried out his mission. The result was that the Fool Hen, the Darby and the Nelson No. 2 were acquired, and these with the Spitzee gave the company an area of 110 acres. The Darby and the Nelson No. 2 having been located under the old law carried with them surface rights, and so among the assets of the company are a large number of townsite lots and blocks. The Spitzee was operated continuously for a couple of years, but was closed down about 18 months since. The shaft and the tunnel sunk to 200 ft., and from the shaft drifts had been run; there are besides several upraises. The returns from the ore sent to the smelter have always been satisfactory, showing that it is of a good grade. The Spitzee Co. realized that in order to make the property yield a profit, a larger plant, a deeper shaft and much more development work was necessary, but as it did not have sufficient capital to buy the plant and do the work it was thought the wisest plan to hand it over to a company having ample capital to develop and operate it and make it yield dividends."

"This lead, like the previous one, is bedded in (purple) sandstone, and is of a good grade. It is a typical mining engineer's report, translated into 'English' by a German.—*London Mining Journal*.

EXPLORATIONS IN A PORTION OF THE YUKON, SOUTH OF WHITEHORSE.

Official Report by D. D. Cairnes.*

YUKON TERRITORY gives much promise of proving rich in lode minerals as well as placer gold. From time to time the *MINING RECORD* has published articles relating to the development of lode mines in the Whitehorse and Windy Arm sections of Southern Yukon. The report of Mr. Cairnes, of the Geological Survey staff, of his explorations in this district in 1906, here reprinted, gives additional information, which being official and reliable will probably be of general interest. He says:

I left Ottawa on May 18, with instructions to proceed to the southern part of the Yukon to investigate primarily, the economic resources of certain areas and, incidentally, to gather as much information as possible concerning the general geology and natural resources of the district, and to make such surveys as were required for a map to accompany the work.

Windy Arm, Tagish Lake, was reached by the usual route and after surveys were completed in the vicinity horses were procured from Whitehorse and work commenced to the north. Just at this time some discoveries of rich gold- and silver-bearing quartz were reported from 15 or 20 miles west of Robinson, which is about 20 miles north of Caribou Crossing. We examined a great number of the most likely looking claims and continued south to connect with our previous work. Thence work was extended north of the Watson River to within about 10 miles of Whitehorse, including the area of the Whitehorse coalfield.

By this time, about September 18, the weather became so severe as to prevent further field operations. We therefore travelled down the river and examined the Tantalus and Five Finger coal mines, as well as the coal on Tantalus Butte, and the surrounding country, securing sufficient detail by transit and compass surveys for a sketch map of the district. Afterwards, on the way south from Whitehorse, two days were spent in the Windy Arm district inspecting the latest development in the different mining properties.

GENERAL DESCRIPTION OF DISTRICT.

The country, generally, consists of wide valleys separated by ridges and groups of mountains, the valleys often containing lakes running, for the most part, in a northwest and southeast direction, approximately parallel to the coast line to the west, but often intersecting in an intricate manner.

In the Windy Arm district the mountains are quite rugged and rise to from 4,000 to 5,000 ft. above the valleys. The principal trees are black pine, fir, spruce, aspen and balsam poplar. Some of the valleys, as the lower part of the Wheaton River valley, are very thickly timbered, the tree-line being at an

elevation of about 2,000 ft. Farther north, in places, the hills become lower and more rolling and west of Cowley and Robinson rock outcrops are often difficult to find. Extensive muskegs exist in places.

AREA SURVEYED.

The district surveyed this season comprises an area of about 50 miles long and 20 miles wide, extending from the British Columbia boundary on the south in a northwesterly direction to within about 10 miles of Whitehorse, the eastern boundary running from Dugdale in a southwesterly direction to the east side of Windy Arm to connect with the northwest corner of Mr. J. C. Gwillim's map of the Atlin mining district, British Columbia. The western boundary is approximately parallel to this direction and extends from the west side of Lake Bennett on the south to about 20 miles west of Dugdale on the north. In addition to this the sketch map, above referred to, in the vicinity of the Tantalus and Five Finger mines, is being prepared.

GENERAL GEOLOGY.

The geology, particularly in the southern part of the district, corresponds generally with that in the Atlin district, and the geological subdivisions as made by Mr. Gwillim are practically those which have been found best to adopt here.

Extending along the eastern side of the district, sometimes included in this area and at times lying to the east of it, is a rather straight range of limestone hills, probably of Carboniferous age. A few fossils were collected, but have not yet been determined. The limestones overlie a series of older slates, cherts and limestone, which outcrop in a number of places on both sides of Windy Arm and on Nares Lake.

Overlying the limestones is a series of altered sediments including some fine-grained generally greenish rocks, which are at times difficult to distinguish from igneous rocks of later age; also some rocks presenting the appearance of much altered slates, although their slaty structure has disappeared. These sediments are in a few localities quite extensively altered to serpentines. The cherts, slates, and altered sediments are included in Mr. McConnell's Tagish series.

Along the western edge of the district are later rocks, the Coast granites, with outlying areas to the east, the granites themselves often becoming quite porphyritic, especially towards the edge of the series. Following along their eastern edge are some older schists, which are partly altered sediments and partly altered porphyries and may correspond respectively to Mr. McConnell's Nasina and Klondike series, in the Klondike goldfields.

Newer than the granites is a somewhat complex series of porphyrites, porphyries, diorites, gabbros, etc., which apparently represent rocks from the same magma, but differ considerably in character on account of segregation, cooling under different conditions, etc. Towards the edge of this series is a rather complex porphyry, presenting on weathered surfaces the appearance of a conglomerate, due to portions of a harder porphyry being included in a more easily weathered one. The mines of the Windy Arm dis-

*In "Summary Report of the Geological Survey of Canada for 1906."

trict are in this series, and for this reason I have called these rocks the Windy Arm series.

Overlying them are some sediments of Cretaceous or Jurassic age, consisting of sandstones, shales and conglomerates, the lower shale beds being conglau-

feldspar crystals is very common. Overlying all, particularly towards the north, are basalt and scoria of recent eruption.

Although numbers of claims had been staked at



Windy Arm, Southern Yukon.

In Windy Arm District the Cretaceous and Jurassic Rocks are in the Lower Series of the Windy Arm Series.

ably altered. A number of fossils were collected, but have not yet been determined. Towards the northern end of the district these sedimentaries are quite extensive and carry valuable coal deposits.

Porphyry dykes cut the sediments and the underlying formations. These later intrusives vary greatly in appearance, but, one, carrying very large, long

one time or another, quartz mining, except a certain amount of prospecting and quartz properties just west of Whitehorse, was scarcely attempted until the latter part of the season of 1905, when Col. J. H. Conrad commenced work on the Windy Arm properties, and though so short a time has elapsed a great deal has been accomplished. The mine now at

Conrad, on the west shore of Windy Arm, has now several hotels, stores, restaurants, churches and so on, and a mining recorder's office. The whole southern part of the Yukon was formerly included in the Whitehorse mining division, but this summer the district became of sufficient importance to warrant subdivision, and the Windy Arm portion, including most of the Watson and Wheaton Rivers district is now in the Conrad mining district. A number of properties were worked continuously last winter and this summer, and considering the amount of development done, several look promising.

Many difficulties were encountered. In addition to the fact that the mines are situated high up in the mountain, wood for fuel and timbering was difficult to secure; supplies and wages being high, prospecting work was expensive; and experienced miners were exceedingly scarce. The current wage paid is \$3.50 (including board) per day of eight hours.

The district is very accessible. Once the ore is landed on the beach by the aerial tramways now running, it is only a matter of 10 or 12 miles around by Windy Arm and Nares Lake to the railway at Caribou Crossing, and a railway spur can easily be built along the shore for this distance. A good route is also possible from Log Cabin, on the White Pass & Yukon Railway, via Whynton, British Columbia, to Conrad.

Practically all the mining claims in the area surveyed this season were examined and a detailed account of each will be given in the final report; at present, only a few of the most important points in connection with the more promising properties will be given.

WINDY ARM PROPERTIES.

Some of the most important claims in this district, commencing at the north, are, respectively, the Big Thing group, Montana, Joe Petty, Aurora, Thistle, Uranus, M. and M., Vault, Venus No. 1, Venus No. 2, all owned by the Conrad Consolidated; the Ruby Silver, owned by private parties, and the Venus Extension, Beach, Red Deer and Humper No. 1, owned by the Anglo-American Company.

Big Thing.—This property is situated about five miles in a northwesterly direction from Conrad, and differs from all other properties in the district, in that it is in granite formation. In the rest, quartz veins run in true fissures in the porphyrites, etc., of the Windy Arm series. The principal vein on the Big Thing was struck this summer at the end of an 8-ft. cross-cut. A drift was then run 60 ft. on the vein, and a winze was sunk which was down about 55 ft. at the time visited last, early in October. The vein, which dips into the hill and appears to be of the elongated lens type, was widening rapidly in the bottom, becoming almost flat, and was about 10 ft. wide. The ore is chiefly secondary quartz and is very porous near the surface, showing considerable leaching action. The minerals are mostly oxides and carbonates, which will eventually change to the sulphides, etc. A considerable amount of stibnite, arsenopyrite and pyrite was found near the bottom.

Occasional very high assays, running into the hundreds, are obtained in gold and silver, and it is claimed that the ore body will average close to \$30 per ton.

The Montana is about four miles south of the Big Thing and, like it and most of the other Windy Arm properties, is situated high up on the bleak mountain side, and all wood, supplies, machinery, etc., have to be packed or pulled up, or carried up on the tramways. A \$90,000 double-cable aerial tramway runs from the northern extension of the Montana, the Mountain Hero, to Conrad, a distance of 18,697 ft. and has its upper terminal 3,464 ft. above the lower.

A drift was run for about 700 ft. in on the vein which is from 2 to 5 ft. in width, with a streak of rich ore 8 to 18 in. next the hanging wall, assaying about \$90. The rest of the vein is much leaner and may run \$20. The strike is about N. 45 deg. W., with low dips to the southwest. An incline shaft is being sunk on the lead, and about October, when last seen, at a depth of 320 ft., the vein was about 8 ft. from wall to wall, containing, however, over 4 ft. near the centre, of almost barren, leached, and somewhat decomposed porphyrite intersected by quartz stringers.

The values are chiefly in silver, the chief mineral being galena, though native silver, silver chloride, lead carbonate, argentite, pyrrargyrite, tetrahedrite, pyrite and arsenopyrite are also found.

The Joe Petty is situated on the north side of Uranus Creek, and contains a strong vein about 6 ft. wide composed of alternating layers of decomposed iron-stained quartz and mineralized country rock. A shaft about 50 ft. deep has been sunk on the lead and drifts run each way; at the end of a 40-ft. cross-cut that cuts the vein in the hill, drifts were also run. No work was done on the property this season.

The M. and M., to the east of the Joe Petty, holds a vein varying in width from 12 to 15 in., but it is high-grade ore, and can be traced for a considerable distance. The high-grade silver minerals, argentite, pyrrargyrite, and stephanite were seen here.

The Uranus is situated just across Uranus Creek from the Joe Petty. The vein is quartz and is traceable for at least 2,000 ft., with an average width, where seen, of about 3 ft. 6 in. The chief minerals are arsenopyrite and galena.

On the Thistle and Aurora, higher up the creek, above the Uranus and Joe Petty, surface work was being carried on, for the greater part of the summer, and very rich ore is reported to have been found. The ore is chiefly quartz, carrying chalcopyrite, zinc blende, malachite, and the rich silver mineral stephanite.

The Vault is situated on the south side of Pooley Canyon, about 3,000 ft. from the beach. When last seen, in October, a drift on the vein was in over 300 ft. This is the same vein, in all probability, as the Venus No. 2, and can be traced for over 4,000 ft. It is in places 20 to 23 ft. in width, being

nearly all well mineralized quartz. In places there are 4 to 6 ft. of almost solid galena. The cross-lead, as on the Venus, varies greatly in width and at times is not more than a foot or so, but on the Vault, so far, except at the surface, at the entrance to the tunnel, it is fairly uniform, much more so than on the Venus. An aerial tramway to the beach is under construction, and a shorter one spans the canyon for the transport of wood and supplies. On

the Vault, (about 700 ft. above the beach) is a good deal of jamesonite and antimony ochre. The ore is chiefly argentiferous galena. Where the vein is wide it consists of alternating bands of quartz and more or less mineralized country rock.

A 25-hp. engine, the output of 100 hp. here to run the machine drills used on this property, but water-power from Pooley Canyon is being installed. An aerial two-bucket tramway 1,525 ft.



In Montana Canyon, Windy Arm District.

First Group of Mines, (see Montana Canyon, Windy Arm District, page 154.)

the whole, this is the most promising looking property in the Windy Arm district.

Venus.—A cross-cut taps Venus No. 2 about 100 ft. from the entry and drifts were run in the lead about the same distance each way. Some stoping also was done, the vein being 18 in. to 16 ft. in width. In the stopes there are 4 to 8 ft. of good ore which will probably average over \$20 in gold and silver. A cross-cut intersects the vein at 544 ft. where drifts were also run. The vein where opened up in the lower level is narrower and leaner than above, but the narrowing is not likely to be very extensive as the vein looks well both to the north and south.

The chief minerals are galena, lead carbonate,

long runs from the lower Venus tunnel to the beach, the upper terminal being 958 ft. above the lower.

Some very rich ruby silver ore is found on the Ruby Silver claim to the west of and adjoining the Venus No. 2. The vein is from 3 to 18 in. in width.

On the Venus Extension are two veins about 30 ft. apart. The upper seam has about 4 ft. of good ore, over half of which was being sacked, when visited in October. The sacked ore will probably run \$50 to \$60 per ton. An incline sunk on the vein was down about 40 ft. The lower seam has about 2 ft. of ore, which is chiefly argentiferous galena with considerable arsenical iron and pyrite.

The Beach claim, lying to the south of the Venus Extension, and supposed to be on the same lead as

the Humper No. 1, has over 10 in. of ore claimed to average about \$150 in silver with probably \$5 in gold. The chief minerals are galena, argentite, zinc blende and pyrite.

The Red Deer has about 6 in. of, in places, almost solid galena, which is claimed to run over \$90 per ton.

The Humper No. 1 is a particularly promising property, though only about 70 ft. of work, which was chiefly in drifts, had been done at the time of my visit. The vein, which can be traced for at least 1,700 to 1,800 ft., is from 18 in. to 4 ft. in width and carries a large amount of argentite, ruby silver and stephanite, as well as native silver, galena, and pyrite. About 8 in. of the vein will average over 300 oz. in silver and a narrow streak of argentite, which is quite persistent and has a width of half to three-quarters of an inch, runs 3,000 oz. in silver.

WATSON AND WHEATON RIVERS PROPERTIES.

Considerable excitement was caused this season by the finding by D. Hodnett and J. Stagar of quartz carrying free gold and telluride minerals between the Watson and Wheaton Rivers. The first claim, the Gold Reef, was staked, on June 25, on Gold Hill, which is situated about 15 or 20 miles southwest from Robinson siding. Within 90 days of the staking over 700 claims had been located.

A belt, or belts, of schists, approximately half a mile wide, outcrops in a northwest and southeast direction, near the eastern edge of the granites, which often become porphyritic. Dykes of greenish porphyry and porphyrite occur in the granites, also near their eastern edge, and it is in this disturbed belt that the quartz veins were mostly found. They are, as a rule, very persistent and can sometimes be traced for several miles. Outcrops of quartz closely resembling each other are seen in almost straight lines, at short intervals, and with the same general strike from the Watson River to about 8 or 10 miles south of the Wheaton River, a distance of nearly 20 miles, and although most of the veins found were in this narrow belt, about two miles wide, Mr. Porter and others discovered, towards the close of the season, some deposits of quite pure stibnite, and other minerals, at a considerable distance to the west.

The first discoveries on Gold Hill, Hodnett Mountain and Mineral Hill are all in the line of strike of the veins and just south of the Watson River. The main lead is for long distances 10 to 14 ft. of almost solid quartz, in places fairly well mineralized with galena, argentite, chalcopryite, malachite, and pyrite. The vein on the Gold Reef which is in the schists, and is well defined on the surface, appears to be 4 or 5 ft. in width. A pocket or seam of very rich ore carrying coarse gold was found in this vein from which came also the rich telluride minerals, sylvanite, hessite and telluric ochre. Further work on this claim has disclosed, as yet, no more of the rich minerals.

A group of claims, the Custer, Alice M., and Ramon, staked south of the Gold Reef on a grey copper

lead looked somewhat promising, although no work had been done when seen. The width of the vein was somewhat indefinite on account of wash and slide rock, but is probably about 6 ft. and appears to be well mineralized.

The Legal Tender, staked by J. Perkins, lies to the northwest of these properties, and is on a very steep rugged hill on the south bank of the Watson River. The vein is in a fissure in the granite, and is three to three and a half feet in width where exposed; it is quartz carrying a considerable amount of argentiferous galena with some chalcopryite, malachite, and pyrite. The values are chiefly in silver and the vein is claimed to average about \$40 per ton.

On Big Bend Mountain to the south of the Wheaton River and seven or eight miles southeast of Gold Hill, and in the line of strike of the mineral belt, a number of claims were staked by L. Belnew, O. Dickson, J. Perkins and others on strong well-defined quartz veins carrying galena, chalcopryite, pyrite, etc. Also southwest of this again, in the same direction, on Stevens Mountain, and to the west of it, a number of similar looking claims were located by Messrs. Stevens, M. Gilliam and others.

In addition to occasional assays running as high as \$300 or over, a number of fairly average assays—from \$20 to \$60—were obtained in this section, but, with the exception of a small amount of work done on the Gold Reef, no attempt has been made to prove to what extent the veins are mineralized or what values they really carry.

Taking into consideration the large quantity of mineralized quartz in this part of the country and the small amount of prospecting done, the results appear encouraging and should stimulate both prospectors and capitalists to investigate this belt more closely, particularly to the northwest and west. There are certainly some rich ores in this section.

Coal, also, was found about two miles to the east of Gold Hill, at the same horizon as that in the Whitehorse coalfields to the north, but whether it will be in payable quantities remains to be seen.

A group of four claims known as the Union Mines is situated on the hills just to the west of Annie Lake, about nine miles due west of Lansdowne siding and about three or four miles east of Gold Hill. These claims were first staked by W. P. Schnobel in 1898, and are supposed to cover the ground known as the "Lost Mine." Some development has been done on them and preparations are being made to work through this winter. A 10-ton shipment of ore gave, according to Mr. Schnobel, returns of over \$20 per ton. The values are chiefly in silver, with a little gold.

WHITEHORSE COAL.

Several seams of anthracite coal are located in an area known as the "Whitehorse Coal" and outcrop about 12 or 14 miles in a southwest direction from Dugdale siding. A tunnel about 60 ft. long has been run on one of these seams and a few open cuts

have been made; otherwise the coal is entirely undeveloped. The strike at the tunnel is true north 63 deg. west with 42 deg. dip to the northeast. The general strike of the measures, which are quite regular and were traced for over 12 miles, is about north 74 deg. west. The seams measured were 9 ft. 8 in., 10 ft. 4 in., 2 ft. 6 in. respectively. The samples taken run high in ash, but they were surface samples and with depth the ash will be very considerably less. Probably a number of other seams exist, as the measures have not been prospected to any extent, although they are very favourably situated for so doing, and a small amount of work should give much definite information. There is a very good grade from the White Pass & Yukon railway into these claims and, considering their proximity to the Whitehorse copper deposits, the town of Whitehorse, and the Watson and Wheaton Rivers claims, this coal should prove of considerable value in the near future.

TANTALUS MINE.

This mine is situated on the west side of the Lewes River, about 190 miles down the river from Whitehorse, being somewhat less than half way to Dawson. As the coal outcrops here on the river banks it is well situated for economic working. The cars are run out of the tunnels, pulled by cable up an incline, from which the coal is dumped into bunkers, ready for loading. Most of the river steamers burn this coal, of which about 7,000 tons will be loaded this season.

Three workable seams are opened up though only the lower two are being mined at present; others may yet be found as the formation is heavily covered in most places. The coal is worked by the stall and pillar system from two tunnels, which were in about 700 ft. when visited in October. Although the seams are dirty, the coal can easily be sorted, but as wages are \$5 with board for underground, and \$4 with board for surface work, this has not been done as yet.

The following section was measured near the end of tunnels:—

Bottom seam—

Coal	2 Ft. 4 In.
Shale	0 " 7 "
Coal	2 " 0 "
Shale	0 " 6 "
Coal	2 " 11 "
Shale	4 " 0 "

Middle seam—

Coal	2 " 3 "
Shale	0 " 2 "
Coal	0 " 7 "
Shale	0 " 2 "
Coal	2 " 0 "
Shale	0 " 2 "
Coal	1 " 8 "
Shale	7 " 0 "

Top seam—

Coal	3 " 0 "
Shale . . . . .	..

These measures are quite regular, and can be traced for over 20 miles down the Nordenskiöld River to the south and over 10 miles to the north, showing that there is an enormous amount of coal in this district, which the measures still have been prospected they may be found to extend much farther. Only coal near the river is, at present, of economic value. The dips are to the east and vary from 24 deg. to 40 deg. Samples taken show the coal to be a bituminous coal that yields an average of about 75 per cent. of a firm coherent coke.

At Tantalus Butte, across the river from the Tantalus mine, the same measures again outcrop, but dipping to the west, showing the presence of a synclinal fold in between. The coal outcrops are near the top of the butte about 400 ft. above the river, having wash and terrace material covering the formation lower down. The best seam seen had 5 ft. of good, firm, clean looking coal with a foot more of coal and shale on the bottom. Other seams seen were dirty and narrow, but there may be good ones obscured by the drift, etc., as practically no work has been done, except small surface cuttings. Altogether, the general conditions of the measures are quite similar to those at the Tantalus mine and this property will probably be worked in the near future. The surface samples obtained did not give a firm coke, but this coal is likely to coke with depth.

FIVE FINGERS MINE.

This is situated on the east side of the river about eight miles north of the Tantalus mine. A considerable amount of coal has been shipped from here, but the old workings, being dangerously situated on the steep clay and sand banks of the river, are not now used. The slope, at present being sunk, is to the north and in safe ground, and at the time visited was down about 525 ft., dipping to the east at 16 deg. The seam at this depth was about 2 ft. wide, and was apparently becoming wider. It had once narrowed to about 6 in. An average of 2 ft. yielded 55.5 per cent. of firm coherent coke. These measures are not the same as those at the Tantalus mine, but are below them. The upper measures outcrop in the valley to the east of the ridge of hills just above the mine.

CONCLUSIONS.

Considering that quartz mining has so lately commenced in the southern part of the Yukon, the results are exceedingly encouraging. Just to the north of the Windy Arm and Watson and Wheaton Rivers properties are the rich and extensive copper deposits west of Whitehorse. The Pueblo, in particular, after this season's development, presents an enormous surface showing of copper ores. A Whitehorse smelter is a probability in the near future, especially as there is plenty of available coal in the Yukon for metallurgical coke. Plenty of water power is also obtainable from Miles Canyon.

Official records show British Columbia's mineral production to the end of 1906 as having reached an aggregate value of \$273,000,000.

DR. ROBERT BELL, F.R.S.

Official Career of Distinguished Geologist and Geographer Who Recently Completed His Fiftieth Year in Government Service.

DR. ROBERT BELL, new chief geologist of the Geological Survey of Canada, on March 1, 1907, completed his fiftieth year of active official service. An appreciative article published a short time ago in the *Montreal Star* closed with the following paragraph: 'Dr. Bell has been engaged in governmental scientific work for half a century, and is still good for many more years of ardent labour, as he retains all the health and energy of youth. No other man living or dead has done anything approaching the amount of good geographical and geological work which he has already accomplished in all parts of the Dominion east of the Rocky Mountains.'

Another tribute to the good work done by this eminent scientist was paid by the same newspaper in the following words: "Dr. Bell has been fortunate in his opportunities for making extensive surveys of two kinds, the work having been done first for the Government of old Canada, and since 1867 for the Dominion Government. The geographical part was done as being essential to the geological, which was the principal object. It is well known that the former has been appreciated for many years, wherever geography is studied, but the latter has really been the more important service to Canada from the utilitarian economic point of view, and it will be found of the highest value as the information acquired becomes more and more needed in the progress of mining and practical geology in the Dominion."

In view of the great service Dr. Bell has rendered to Canada during his long and eminently useful official life, the *MINING RECORD* deems it fitting that in the West, which has benefitted materially by Dr. Bell's practical interest in its economic geology, much publicity shall be given to the fact that the chief geographical societies of the English-speaking world have recognized the extent and value of the geographical part of his work and have in consequence honoured him as it falls to the lot of but few men to be honoured. In furtherance of this idea a comprehensive review of Dr. Bell's official career, which appeared in the *Ottawa Free Press*, is here reprinted, as follows:

"Dr. Bell's extensive work during his long connection with the Geological Survey of Canada has been of an original and practical character, and has been carried on largely in the wilder parts of the Dominion. Great zeal, perseverance and patience, as well as courage and endurance, were required for its successful execution. Very extensive topographical and geological explorations and actual surveys were made, comprising sea coasts, many of the larger rivers and great numbers of the smaller ones, as well

as hundreds of lakes, all over the territory northward nearly to the Arctic Circle. The performance of these duties involved innumerable risks and much hardship and suffering from fatigue, cold, wet and hunger. In connection with the foregoing work, investigations were constantly made as to the mineral resources, the forests, the contour of the country, the soil, climate, fisheries, the fauna and flora in general, and everything which might constitute the natural wealth of these immense and almost unknown regions. Dr. Bell's great opportunities have enabled him to publish several valuable papers and maps on the forestry of Canada. It is everywhere acknowledged that the outcome of this pioneer work is now proving most valuable in promoting the rapid development of the Dominion and in bringing the country to its present condition of advancement and prosperity.

"Among the most important advantages already derived from Dr. Bell's surveys and maps have been their use in the general location of parts of the Canadian Pacific Railway, and of long stretches of the Grand Trunk Pacific Railway in the extensive territories between Quebec and Winnipeg. His numerous reports describing accurately that country constituted the "mountains of information" available at the time of the inception of the transcontinental railway scheme, and enabled the parliament of Canada to decide, at once, to construct the proposed line, thereby saving the time which would otherwise have been required to exploit the country before this enterprise could have been authorized with any degree of confidence.

"Dr. Bell's extensive work was recognized in May last by the Royal Geographical Society, when its council unanimously awarded him the Patron's or King's Gold Medal, its highest prize, with the cordial approval of His Majesty, and in the month of November of the same year, the American Geographical Society also awarded Dr. Bell its principal distinction, the Cullum Gold Medal, which had not previously been given to any geographer in Canada. He has also done good service to geography as a member of the Dominion Government Geological Board. He was president of the International Congress of Americanists, which held such a successful meeting at Quebec last September, and was re-elected president for the next congress which is to meet in Vienna in 1908.

"Dr. Bell holds many scientific and academic distinctions, among which may be mentioned: F. R. S., D. Sc. (McGill), Sc. D., Hon. (Cambridge), LL. D. (Queen's), M. D., C. M. (McGill), F. G. S. (London and Am.), foundation Fellow of the Royal Society of Canada, Member of the American Institute of Mining Engineers, Hon. Member of the Medico-Chirurgical Society of Montreal, etc., and he has been honoured by the King with the Companionship of the Imperial Service Order 'for faithful service.' He was professor of the natural sciences at Queen's University, Kingston, for five sessions, and served

as one of the Royal Commissioners of the Mineral Resources of Ontario, 1888-89, whose report was so welcomed and highly esteemed by the public, as supplying a long-felt want. He has published more than 200 reports and papers on the geology, geography, biology, forestry, etc., of Canada.

"Dr. Bell accompanied the three Canadian Government expeditions into Hudson Bay by the respective steamships 'Neptune,' 'Alert,' and 'Diana,' as naturalist and geologist, and also as medical officer on the two expeditions first-named. He has also navigated Hudson Strait in other vessels and has made a total of nine through passages.

"On being placed in charge of the Geological Survey early in 1901, Dr. Bell was presented with an address, signed by all the staff, expressing their satisfaction and assuring him of their hearty and unanimous co-operation in the various branches of the work. Immediately after assuming the duties of this office he set about the task of giving a more directly practical character to the operations of the Survey and confined its researches as much as possible to economic geology, as shown by the reports. A series of bulletins on the 'Economic Minerals of Canada' was commenced, and sixteen of them were issued, while a number of others were written and now await publication.

"While acting as director for more than five years, Dr. Bell inspired enthusiasm and the survey accomplished every year fully double the amount of original work in both field and office which had been done in previous years. Instead of about a dozen field parties, as formerly, more than 30 on an average were sent out each season to those districts where he knew they were most needed. The annual 'Summary Report' was greatly improved, and the arrears of printing were all brought up to date. Money was obtained for preparing a necessary index to the whole series of annual reports.

"Grants were also procured for increasing considerably the draughting and the engraving of the Survey, so as to keep pace with the field-work. Of the total number of maps which have been published during the 63 years from the commencement of the Survey almost half were produced during the five years Dr. Bell was in control. The library of the department has been greatly improved by the purchase of much needed books, for which a special grant of \$2,700 a year was obtained. The distribution of specimens of rocks and minerals to educational institutions throughout Canada was improved and systematized.

"Dr. Bell originated the International Committee of the Canadian and United States Surveys which has already accomplished so much in geological correlation and in harmonizing the results of geological work over the whole continent.

"At the time British Columbia was incorporated with the Dominion, Dr. Bell suggested the clause in the agreement which requires a geological survey to be constantly maintained and in 1904 he obtained,

through the action of the government, an additional grant of \$10,000 a year in addition to the \$75,000 additional work on the economic geology of British Columbia and the Yukon Territory.

"Dr. Bell has enjoyed exceptional opportunities for examining a great number and variety of mines, not only in the older provinces of the Dominion, but also in British Columbia and Yukon Territory; and outside of Canada, in the northern United States, in California, Arizona, Mexico, in Great Britain, Germany and eastern Europe. Long study and extensive observation are essential to enable a geologist to judge of the probable value of undeveloped mineral prospects. For many years before the Survey began to collect mining statistics officially, Dr. Bell had every year gathered full information on this subject and now possesses a record of mining operations since 1863.

"A considerable number of Dr. Bell's former assistants or students occupy distinguished scientific positions in Canada and the United States, including a number of professorships in the universities of both countries. Although the members of the staff were poorly paid, not one of them left the Survey during his administration.

"It was owing to Dr. Bell's initiative that the offices and museum of the Geological Survey were removed from Montreal to Ottawa in 1881."

THE JAMES GOLD MEDAL

Regarding the respective medals of which Dr. Bell has been the honoured recipient, it may be mentioned that the Patron's or King's Gold Medal, which is the chief yearly prize of the Royal Geographical Society, was founded when the society was established, in 1830. The medal itself is a beautiful work of art and is paid for by the King. Some of its recipients in the earlier days were Enderley, Burns, Chesney, Carl Ritter, Fitzroy, and later Sir George Nares, for geographical services in various parts of the world. Among those who have won the Patron's Medal for their explorations and surveys in North America were Thos. Simpson, Dr. Rae, Captain Back, John Ross, Captain Palliser, Sir Robert McClure and Sir Leopold McIlintock. This medal or other award of the Royal Geographical Society has been bestowed upon the more noted African explorers, such as Dr. Livingston, Captains Speke, Grant and Burton, Sir Samuel Baker and Sir Henry M. Stanley.

THE CULLUM MEDAL

Like the Patron's Medal of the British society, the Cullum Medal of the American Geographical Society is the principal prize the latter has to bestow. It is a magnificent gold medal, artistically executed, and its cost is defrayed by the revenue from \$5,000 bequeathed to the society by the late General George W. Cullum of the United States army. His will directs that the income from the above bequest is to be used for the presentation annually of a gold medal "to those who distinguish themselves by geographical discoveries or in the advancement of geographical

science, particularly citizens of the United States of America." The recipient is to be chosen by at least a two-thirds vote of the whole council of the society.

The fact that this is the first time the Cullum Medal has been voted to a geographer in Canada gives great additional value to its award to Dr. Bell. Among those who in other years received this coveted prize are Captain R. E. Peary, of the United States navy, and other distinguished men, who have done special service to geography on this continent and in other lands.

Sincere congratulations have been tendered to Dr. Bell from all parts of Canada, and these are heartily joined in by many in the West who hold him in high esteem, both from a personal standpoint and in appreciation of his eminent services.

COALS AND COAL FIELDS OF ALBERTA, SASKATCHEWAN AND MANITOBA.

By D. B. DOWLING.*

ANY DESCRIPTION of the coal fields of the three prairie provinces to be complete would necessarily be lengthy, but the present paper is an attempt at a resume of the extent and character of the coals to be found there.

The rocks in which these coals are found all belong to the sediments of the Cretaceous sea and the coal horizons are in three successive portions of the period. Each one marks a time when the surface was not very much above the sea but high enough to support a luxuriant flora. The history of the period seems to be as follows: At the beginning of the Cretaceous time the land surface consisted of limestone beds which extended westward to the Selkirks. This began to sink along its western margin, concurrently with an elevation in the Selkirk region. The sinking went on to below sea level but the subsidence was made up by a heavy deposit of sand and mud derived mostly from the elevated land to the west. This then gradually spread eastward but was very intermittent, so that large land areas were formed and covered by vegetation. A great submergence beneath a muddy sea next occupied a long portion of the Cretaceous time, but again the crust was sufficiently elevated to bring the muddy bottom to sea level. The western portion did come to the sea level or even above it and coal deposits were formed; but it is not definitely known how far east they extended. One total submergence succeeded another, but for shorter time, before this new muddy surface rose above the sea for the last time; and again in its transition period coal beds were formed.

This threefold coal-forming period gives us three horizons in which to look for coal: At the base; above the middle; and at the top of the Cretaceous sea deposits.

The first we call the Kootanie; the second the

Belly River; and the third the Edmonton or Laramie.

In the three formations the quality of the coal varies under two fairly good rules. The first is that in the same district coals of the lower horizons, owing to age and pressure of the beds above them, should show a greater percentage of fixed carbon and also be more compact. The second is a general tendency to increase both the fuel ratio and the compactness in going toward the mountains, mainly on account of the increase in the thickness of all the deposits in that direction and thus the load over the seams. The fuel ratio is the fixed carbon divided by the volatile combustible matter and the term porosity is here taken to mean the percentage of water absorbed by the coal.

KOOTANIE MEASURES.

The lowest horizon is exposed in the raised and tilted blocks of the crust shown in, and in the neighbourhood of, the Rocky Mountains. The quality of the coal, as given by the fuel ratio, varies considerably; and from a number of analyses the following notes will show the general range:

In the Elk River region the variation shown at Morrissey ranges from 3.2 to 6.12. At Fernie the ratio increases from 3.22 to 4.60 in the lower seams. At Michel two seams differ slightly, the ratios being 3.5 and 3.7. The eastern outcrops of some of these seams on Marten Creek evidently show less change in the physical structure as the ratio falls from 2.08 to 1.86. In order to bring all the areas under notice lists are added giving full rate and thickness of seams arranged in order of hardness. The areas within the mountains may briefly be outlined as:

(1) Elk River basin with 22 workable seams containing 216 ft. of coal. This, with a slight gap, extends north to the head of Elk River.

(2) Crow's Nest areas, several narrow blocks known as the Coleman-Blairmore areas, with 21 seams and 125 ft. of coal and extending north ending with the Sheep Creek area in front of Mount Rae.

(3) Moose Mountain area, south of Morley, with 2 seams, 7 and 8 ft. respectively.

(4) Cascade area, running from the mountains north of the Elbow River northward to near the Saskatchewan, having mines at Canmore and Bankhead. In the vicinity of the Bow River there are 10 to 14 workable seams and 75 to over 100 ft. of coal. Its extension north of Red Deer River has 15 workable seams with 114 ft. of coal.

(5) Palliser area on Panther Creek, east of Cascade coal basin, several seams known. Area not extensive.

(6) Costigan area on Panther Creek, five seams known with 27 ft. of coal.

(7) Bighorn area running from Saskatchewan River north to past Brazeau River, only about 5 seams yet located, largest 16 ft.

(8) Other areas in foot-hills, or farther north, not yet discovered.

The Kootanie coals are all so well compacted that less than 2 per cent of water, as a rule, is absorbed

*Of the Geological Survey of Canada. Paper contributed to the annual meeting of the Canadian Mining Institute, held at Toronto, Ontario, March, 1907.

Comparisons of the fuel ratios in the Kootanie coals give us what might be called a scale of their hardness. The same comparisons in the fuels of the upper horizons show only the degree of alteration that has taken place in them during their change from vegetable matter toward the more stable condition as coals. They all show, in a marked manner, that their substance has not been so compactly pressed, as they all absorb much greater percentages of water. The Belly River coals are slightly denser than the Edmonton coals of the same district, but it is not until the seams outcrop near the mountains that this character is well marked.

In the western upturn they carry less than 3 per cent. of water, while the Edmonton coals run from 3 to 7 per cent. For the Lethbridge area the difference is not so strongly marked except at one or two localities.

COALS OF BELLY RIVER FORMATION IN WESTERN
UPTURN OR FOOTHILLS.

Localities	Fuel ratio. Per cent.	Porosity. Per cent.	Thickness of seam.	
			Ft.	In.
Head of Mill and Pincher Creeks	2.96	1.90	8	0
Mill Creek, 4 miles above mill..	2.02	1.63	8	0
Sheep Creep, Tp. 19, R. 4 west of S.	1.62	2.16	5	0
Sheep Creek, Tp. 19, R. 4 west of S.	1.57	2.50	7	0
Morley, on Indian Reserve.....	1.18	1.26	6	0

COALS OF BELLY RIVER IN LETHBRIDGE AREA.

Localities	Fuel ratio. Per cent.	Porosity. Per cent.	Thickness of seam.	
			Ft.	In.
Taber Coal Co.....	1.83	10.8	3	3
McPhee mine near Taber.....	1.72	11.35	2	7
10¼ miles above Medicine Hat.	1.62	17.70	4	0
Belly River, Driftwood Bend..	1.40	9.18	3	3
St. Mary River, 7 miles from mouth	1.38	7.02	3	8
10 miles above Medicine Hat...	1.38	16.82	4	0
Bow River, Grassy Island.....	1.34	11.96	4	6
Red Deer River, 9½ miles below Bull pd.	1.32	5.58	3	0
Milk River Ridge, north side..	1.26	6.50	5	6
Lethbridge, main seam	1.25	20.54	5	0
Stair, main seam	1.15	13.63	1	6
Red Deer River, 4½ miles below Bull pd.	1.19	12.62	1	3
Red Deer River, 2 miles be- low Bull pd.				

LARAMIE—EDMONTON AREA.

The larger coal areas of both Alberta and Saskatchewan are of the above formations and are practically on one and the same horizon, which occupies the dividing line between sea deposits below and

fresh water and land deposits above. Some of the coal seams are in the upper fresh water stage—the top of the Laramie; but the majority are in beds separated by sands and clays, holding remains of organisms which lived in brackish water—the Edmonton or Lower Laramie. In Saskatchewan the divisional lines between these deposits are not worked out; but in Alberta, the beginning of fresh water stage is drawn at about the horizon of the “Big Coal Seam” on the Saskatchewan. The formation originally probably covered a very large area, but the uplift of the western edge and the subsequent denudation of a great part of the plateau formed of these soft beds, has left remnants only of the upper coal rocks. In Saskatchewan these remnants occupy the high lands in the Cypress Hills and Wood Mountain and a triangular area eastward from the Coteau.

A great excavated depression running outward from the mountains, branching to north and south of the Cypress Hills, separates them from the plateau running north and south and sloping eastward from the foot of the mountains. The western coal area occupies a belt near the eastern edge of this slope, narrow at the south but widening northward reaching its maximum in the latitude of Edmonton. The coal rocks are then covered farther up the slope by heavy beds of sandstone, but emerge from under them along a narrower band just in front of the foot-hills in some parts and in others, generally in the south, nearer the mountains. There is thus one part of the field which has suffered much pressure and in this the coals show the effect of the compression. The thickness of the seams in this area appears to increase to the north. Thus in the vicinity of Bow River, seams of 4 ft. 6 in., 6 and 9 ft. are the best that are known; but in the vicinity of the Saskatchewan, seams of 8, 18, 4 and 6 ft. occur near Edmonton and at the Pembina River the horizon of the Big Seam shows three seams, 13, 13 and 6 ft. or 32 ft. of coal.

In the Saskatchewan areas, the coal seams of the Cypress Hills and eastward to Wood Mountain, are all thin; but a 4-ft. seam south of Cypress Hills may prove fairly persistent. In Wood Mountain two seams of 6 and 8 ft. respectively will probably be utilized. On the eastern side of the Coteau at the Dirt Hills three seams, 7, 3 and 6 ft., are reported. In the Souris district seams of 5 and 8 ft. are being mined, the latter reported as thickening to 15 ft. toward the east.

In the following list which is here, for uniformity, arranged as the others in order of fuel ratio, the porosity runs somewhat at variance with this scheme; but if the arrangement had been by porosity only a regular progression from west to east would have been nearer secured, since all the coals absorbing water 3 to 7.1 per cent. actually come from the beds in the disturbed western part of the field. All those absorbing from 8 to 14 per cent. are from the eastern portion of the Edmonton field, while all with a porosity of from 14 to 22 per cent. are from the Saskatchewan areas.

LIST OF LARAMIE AND EDMONTON COAL—ORDER OF
DECREASING RATIO.

Locality	Feet	Feet	Feet
Shoals Coal mine, Fork Creek	1.60	3.70	2.30
Blackfoot Reserve, 6½ miles below Crossing	1.60	1.5	12.31
Big Seam, Saskatchewan River	1.60	1.3	11.14
Indian Farm, Pincher Creek	1.58	5.38	3.30
North Fork, Highwood River	1.50	6.12	4.06
Athabaska River, above McLeod River	1.53	10.58	3.90
Athabaska River above McLeod River	1.49	11.47	10.00
Edmonton, just below town	1.40	12.89	6.00
Pembina River Tp. 53 R. 7 west of 5th lowest	1.48	13.07	6.00
Pembina River Tp. 53 R. 7 west of 5th highest	1.47	13.78	13.00
Red Deer River in foot-hills	1.46	4.97	9.00
Rocky Mountain House seam	1.45	7.01	2.00
Red Deer River 4 miles below Tail Creek	1.41	10.02	5.11
Red Deer River, mouth of Rosebud	1.40	13.08	6.00
Battle River, Meeting Creek	1.30	11.08	4.00
Sheep Creek Coal mine, Linenhams P. O.	1.38	3.08	4.00
Coal Creek, west of Cochrane, Alta.	1.38	4.93	4.00
Edmonton, The Ross seam	1.34	11.47	4.00
Red Deer River, 12 miles above Tail Creek	1.33	7.66	7.00
Knee Hills Creek	1.33	9.86	4.00
Crowfoot Creek, 4 miles from Bow River	1.33	11.23	6.00
Bow River, 4 miles below Blackfoot Crossing	1.31	10.72	8.11
Big Island, 12 miles above Edmonton	1.30	8.92	3.00
Egg Creek, near Victoria, Alta.	1.24	11.01	1.00
Borehole on Souris River, east of mines	1.26	17.78	6.00
Dirt Hills, upper seam	1.24	14.80	7.00
Dirt Hills, lowest seam	1.24	15.30	6.00
Dirt Hills, middle seam	1.11	17.53	3.00
Souris River, mouth of Short Creek	1.10	21.84	3.00
Long Creek, one mile north of Wood End	1.08	15.11	7.00
Bow River, three miles south of Horseshoe Bend	1.06	11.13	4.00
Poplar River Tp. 1, R. 28 west of end	1.01	12.05	18.00
Willow Creek, south of Cypress Hills	0.93	7.17	4.00
Wood Mountain, lowest seam	0.94	12.26	8.00
Hay flat	0.99	17.71	11.00
Upper seam	0.96	18.61	2.00
Turtle Mountain, from locality in Dakota	0.90	15.10	3.00
Long Creek, opposite Estevan	0.83	7.07	6.00
Long Creek, near Wood End	0.79	14.73	7.00
Big Muddy Creek, south of Willow Bunch	0.88	16.28	5.00
Big Muddy Creek, south of Willow Bunch	0.88	18.33	4.00
Big Muddy Creek, south of Upper seam	0.84	15.20	3.00

THE SHINING BEAUTY GROUP OF GOLD.

THE GOLDEN STAR, lately obtained from the manager of the Laborers' Co-Operative Mining Co. a statement concerning that company's Shining Beauty group of mineral claims. The proper part of this dealt with results obtained from sampling and assaying, both of which were, it is stated, systematically and carefully done last year by the late Frank N. Anderson, who up to the time of his death was the company's technical manager.

In addition to the somewhat full particulars above-mentioned, the following information was given:

The upper tunnel, designated No. 1 of the Shining Beauty group, is located about 280 ft. below the summit of the mountain range. No. 2 is situated about 175 ft. perpendicularly below No. 1; its mouth is distant from that of No. 1 down the mountain 212 ft. at an angle of 65 deg.

Mr. Anderson, until his death, had development work, which he believed would successfully and economically develop the Shining Beauty group of mineral claims into an early dividend-paying property, and at no great outlay of money. Accordingly he advised the installation of an electric drilling plant at an early date, which would hasten development work, and save the company (until then) losses. It was his opinion that the tunnel should be driven into the mountain at least 1,000 ft. further to fully determine the general character of the ore body, as it is changing. He had scientific reasons for believing that some of the present ores would disappear and the others become stronger, while the lodes of mineral would become more valuable, so for him to advise, at this time, the installation of a mill, cyanide or reduction plant, was premature, for if now installed, it might in the near future require some radical and expensive changes at the cost of the stockholders.

The manager advised the board of directors of the Laborers' Co-Operative Co. to first develop the mines to ascertain the true character of the ores and their intrinsic values, and then, when the proper time shall come, no mistake will be made in the installation of a reduction plant.

Between \$17,000,000 and \$18,000,000 is the aggregate value of all lead produced in British Columbia in twenty years, 1887-1906. The total for the first half of this period was only \$1,581,000; that for the latter half was \$16,044,000. The highest year was 1900 with a total value of \$2,692,000.

In twenty years, 1887-1906, silver to the value of \$25,586,000 has been mined in British Columbia. The yearly production has ranged from a minimum of \$4,000 in 1891 to a maximum of \$3,273,000 in 1897. The aggregate for nine years, to end of 1895, was \$1,928,000; a substantial increase was made the next following year, for which the total was \$2,100,000. Since then the annual production has varied in amount between that of \$1,521,000 in 1903 and that shown above for 1897.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi—March: Shipments amount to 12,310 tons, containing 2,330 oz. gold, 5,200 oz. silver and 230,000 lb. copper. Estimated profit on this ore after deducting cost of mining, smelting, realization and depreciation, \$2,000. Expenditure on development work during the month, \$16,500. (Office note.—Coal and coke supplies are now available, and two furnaces are being operated at the Northport smelter. An option has been taken by this company upon the Spitsee and certain other mineral claims adjoining the *Le Roi* property.)

Le Roi No. 2—March: Josie mine report: Shipped 2,100 tons. The net receipts are \$31,636, being payment for 1,874 tons shipped and \$1,815 being payment for 67 tons of concentrates shipped, in all \$33,451. Vancouver mine report:—Shipped 57 tons. The net receipts are \$855, being payment for 18 tons shipped, and \$3,075 being payment for 37 tons concentrates, in all \$3,930. The mill has been running since the flume was repaired, March 21.

Sloagh Creek—Early in April the manager cabled from British Columbia: "New machinery started working on 2nd inst." A few days later he advised by cable: "New machinery running well."

Tyee—March: Smelter ran 19 days, and smelted—Tyee ore, 1,823 tons; custom ore, 2,640 tons; total, 4,472 tons. Matte produced from same, 432 tons; gross value of contents (copper, silver and gold), after deducting costs of refining and purchase of custom ore, \$21,281.

U. S. A.

Alaska Mexican—March: 120-stamp mill ran 25¾ days; crushed 18,106 tons of ore; estimated realizable value of bullion, \$28,476. Saved 290 tons sulphurets; estimated realizable value, \$20,755. Working expenses, \$30,886.

Alaska Treadwell—March: 240-stamp mill ran 27¾ days; crushed 30,100 tons; estimated realizable value of bullion, \$32,190. Saved 750 tons sulphurets; estimated realizable value, \$43,245. Working expenses, \$73,225.

Alaska United—March: Ready Bullion claim 120-stamp mill ran 27½ days; crushed 18,870 tons ore; estimated realizable value of bullion, \$20,850. Saved 274 tons sulphurets; estimated realizable value, \$10,362. Working expenses, \$33,563.

DIVIDEND.

The customary quarterly dividend at the rate of ten per cent. per annum on the issued capital stock of the Consolidated Mining and Smelting Co. of Canada, Ltd., has been declared payable to all shareholders when the company's share books closed on April 22. The amount of issued stock is \$4,833,800 and the dividend \$120,845.

NOTES.

Notice is given that three months after May 3, 1907, the British American Dredging Co., Ltd., will apply for authority to change its name to that of the British Columbia Electric Mining Co., Ltd.

At a meeting of shareholders in the Morrison Mines, Ltd., held recently at Greenwood, Boundary district, the sale of the company's property to the Dominion Copper Co. was ratified and confirmed.

The adjourned annual general meeting of shareholders in the Crow's Nest Pass Coal Co., Ltd., has been called for May 2, in Toronto, Ontario.

The annual general meeting of the Reward Gold and Silver Mining Co., Ltd., is to be held in St. Paul, Minnesota, U. S. A., early in May. Fred C. Elliott, barrister, of Trout Lake City, Lardeau, the company's representative in British Columbia, has gone to St. Paul to attend it.

The Ferguson Mines, Ltd., has resumed work at its Silver Cup mine, after a suspension of about a month. This mine is situated a few miles from the town of Ferguson, northern Lardeau.

In the matter of the Consolidated Mining and Smelting Co. of Canada, Ltd., plaintiff, and the Rossland Red Mountain Consolidated Gold Mining Co., Ltd., defendant,

the latter being a judgment debtor to the former in the amount of \$26,589.39 and costs, the Red Mountain mineral claim, situated near Rossland, was on April 10 sold by auction by the sheriff. The purchaser was R. H. Stewart, mine manager for the plaintiff company.

On April 14 the Rossland *Miner* stated that all ore from the *Le Roi* mine will hereafter be sent to the *Le Roi* Co.'s smelter at Northport. The contract with the Consolidated Mining and Smelting Co. of Canada has been cancelled by mutual agreement, so no more ore will be sent to the latter company's smelter at Trail.

The Canadian Marble and Granite Co. of Nelson has secured the contract for the supply of the dressed stone required for the new post office to be erected at Fernie, Crow's Nest Pass, East Kootenay.

The contract for driving 200 ft. of tunnel on the Dominion Copper Co.'s Crown Silver claim in Deadwood camp, Boundary district, has been completed. It is claimed that a district record for tunnel-driving was made with 65 ft. driven in two days, working two 8-hr. shifts.

John Leask of Cranbrook, official liquidator, requires all creditors of the Payroll Gold Mining and Milling Co., Ltd., to prove their debts or claims.

The Phoenix Amalgamated Copper Mines, Ltd., owning a group of mineral claims situated in Phoenix camp, Boundary district, has issued a circular notifying its shareholders that an offer has been received from a New York syndicate of \$1.75 per share for the 200,000 shares held as treasury stock. A further offer of \$1.50 per share for 200,000 additional shares is made; the remaining 100,000 shares comprising the balance of the stock in the company (which is capitalized at \$5,000,000 in 500,000 shares at \$10 each) to be deposited with the Eastern Townships bank and held in trust for a period of two years from the time the options shall be executed in favour of the syndicate.

CERTIFICATES OF INCORPORATION.

Bornite Company, Ltd., with a capital of \$20,000, divided into 20 shares of \$1,000 each.

British Columbia Gypsum and Plaster Company, Ltd., with a capital of \$100,000, divided into 1,000 shares of \$100 each. Included in the objects for which this company has been incorporated are the following: To purchase the Marie, Flora, Bell, and Hart mineral claims, situated on the west side of Thompson River, opposite Spatsm, B.C.; to carry on the business of a mining, smelting, milling and refining company.

Cranbrook Fire-brick and Terra Cotta Company, Ltd., with a capital of \$50,000, divided into 50,000 shares of \$1 each. Included in the objects for which this company has been incorporated are the following: To acquire the mineral claims, etc., of Frank L. Byron, at or near Old Town, Perry Creek, East Kootenay; to carry on at Cranbrook and elsewhere the business of manufacturers and vendors of fire bricks, crucibles, scori-fiers, and all fire clay products for metallurgical, building and other uses; and to locate or otherwise acquire mineral or petroleum properties, and to work the same.

Giant-California Mining Company, Ltd., with a capital of \$5,000,000, divided into 50,000 shares of \$100 each. The following are included in the objects for which this company has been incorporated: To adopt and carry into effect a certain agreement made on December 10, 1906, between Jay P. Graves, for and on behalf of the California Gold Mining Company (foreign), and Stuart Charles Cumberland, for and on behalf of the Giant Mining Company, for the purchase by and sale to this company of the whole of the assets of the Giant Mining Company, Ltd., and the California Gold Mining Company (foreign), free from incumbrances; to carry on the business of a mining, smelting, milling and refining company in all or any of its branches.

REGISTRATION OF EXTRA-PROVINCIAL COMPANIES

Quesnelle Hydraulic Gold Mining Company—Head office at Camden, New Jersey, U. S. A. Capital, \$1,700,000, divided into 1,700,000 shares of \$1 each. Head office in British Columbia at Vancouver. Attorney, William Ernest Burns, barrister, Vancouver.

Crow's Nest Pass Coal Co.—Head office at Spokane, Washington, U. S. A. Capital, \$2,000,000, divided into 2,000,000 shares at \$1 each. Head office in British Columbia at Victoria. Attorney, Oscar Chapman Bass, barrister, Victoria.

Brown-Alaska Company—Head office at Seattle, Washington, U. S. A. Capital, \$1,000,000, divided into 1,000,000 shares of \$1 each. Head office in British Columbia at Maple Bay, near Port Simpson. Attorney, A. A. Wakefield, mining engineer, Maple Bay.

COMPANY REGISTERED IN ENGLAND.

Walker's Fork Gold Dredging Company, Ltd.—Registered in London February 28, by Keith & Humphries, 42 Chancery Lane, W.C. Capital £70,000, in £1 shares. Objects: To accept an agreement with R. H. Milvain and J. G. McLaren, to carry on the business of a dredging, mining, prospecting, and exploration company in Alaska and elsewhere, and in particular to acquire the placer mining claims in the Forty-Mile district. No initial public issue. The first directors (to number not less than three nor more than five) are: J. R. King, L. L. Cox, and C. Fearn. Qualification, 1,000 ordinary shares. Remuneration (except managing directors), not more than £300 per annum, divisible, unless increased by the company. Registered office: Grove House, Harrogate, Yorks.

MACHINERY AND CONSTRUCTION NOTES.

The Consolidated Mining and Smelting Co. of Canada has purchased six 12-ton electric locomotives from the Jeffrey Manufacturing Co. of Columbus, Ohio. These are for underground work in the company's mines—three for the Centre Star-War Eagle mines at Rossland, two for the St. Eugene at Moyie, and one for the Snowshoe at Phoenix.

Wm. Waldie of Nelson, owner of the Queen mine near Salmo, Nelson mining division, has purchased from the Jenckes Machine Co. a 7x10 Blake crusher to replace a Comet crusher which was lately broken at the mine.

The Canadian Rand Co. is supplying to, and installing at, the Lille colliery of the West Canadian Collieries, Ltd., near Frank, southwest Alberta, a haulage plant consisting of a 4-stage air compressor, locomotive, and pipe-line storage, complete. The capacity of the compressor is about 700 cu. ft. per min. compressed from atmosphere to 1,000 lb. gauge, which nominally means sufficient for four locomotives. The capacity of the locomotives is, generally speaking, a train of 40 cars of coal up a 1½ per cent. grade. The company is supplying a similar system each to the H. W. McNeill Co.'s colliery at Canmore and the Hilcrest colliery near Frank. These systems are almost identical with those previously supplied by the Canadian Rand Co. to the Crow's Nest Pass Coal Co.'s Michel colliery, and the International Coal and Coke Co.'s colliery at Coleman, Alberta.

The Dominion Copper Co. about the end of April commenced operating the 25-drill Rand duplex tandem compound electrically-driven air compressor, the installation of which at the company's Idaho mine at Phoenix, Boundary district, had just been completed. The compressor is to furnish compressed air for the Idaho, Brooklyn, Stewindler and Rawhide mines, all in Phoenix camp. A full equipment of Little Giant Rand machine drills has also been obtained for each of the mines named.

At its Centre Star mine power-house at Rossland the

compound engine has been changed over from steam to electricity. On April 28 the 650-h.p. Canadian Westinghouse induction motor was started. This drives both the Centre Star 40-drill air compressor and the War Eagle 25-drill engine. The latter is an Ingersoll machine lately changed to a 2-stage engine by putting in Rand compound cylinders.

Early in April a hoist for the Maggie mine was received at Ashcroft with instructions to forward it to the mine as soon as practicable, for prompt installation.

TRADE NOTES AND CATALOGUES

Bulletin No. 12 issued by Mussels Limited of Montreal, Quebec, gives a description of double-cylinder single-drum hoists; also information relating to mine cages, landing chairs and self-dumping mine buckets.

The Hill Publishing Co. of New York, publisher of the *Engineering and Mining Journal*, *Power* and the *American Machinist*, has issued a 108-page catalogue of technical books and other of its publications. It is of handy pocket size and its contents are so arranged under various headings as to be convenient for reference. It can be obtained gratis on application to the publisher at 505 Pearl Street, New York, U. S. A.

An illustrated account of a visit to the works of the Canadian General Electric Co., Ltd., at Peterboro, Ontario, and to the factory of the Canada Foundry Co., Ltd., near Toronto, has been published in pamphlet form. This is a reprint of an article that was published in the *Toronto Globe*. It is interesting and well worth reading.

The orders for gas engines in large units the Westinghouse Machine Co. secured during the first three months of the present year exceeded by far the aggregate of the business for the same period of last year. There is every indication that the company's business during 1907 will show a healthy increase.

The Spokane & Inland Empire Railway Co. of Spokane, Washington, U. S. A., has concluded negotiations with the Westinghouse Electric and Manufacturing Co. for furnishing eight more 72-ton single-phase electric locomotives, making 15 in all. This is an important contract for the reason that this railway was one of the first in the country to adopt the alternating-current single-phase system. The Spokane & Inland runs from Spokane to Lockport, Idaho, a distance of 130 miles.

The possibilities of concrete block construction are apparent to everybody. The rich appearance of concrete blocks, their durability, their resistance to heat and cold, the ease and rapidity with which they can be put into their place, and lastly their cheapness, has made them the most efficient building material in existence. Anybody can make blocks with little experience with the "Ideal" machine. It is capable of 57 varieties of blocks which are adaptable to any style of architecture and ornamental effect. This machine can never break or wear out in service. Instantly adjusted to make any style of block. Write for catalogue, Mussels Limited (formerly W. H. C. Mussen & Co.) Montreal.

Two more circulars—No. 1028, Rotary Converters, and No. 1067, Air-Blast Transformers—have been issued by the Canadian Westinghouse Company, Ltd. The rotary converter has bridged the gap between alternating and direct-current practice and made possible an effective union of the two systems which has largely contributed to the tremendous advance in electrical application experienced during the last few years. Circular No. 1028 describes in detail and fully illustrates a number of installations of these converters. The other circular deals similarly with air-blast transformers, the advantages claimed for which are—cleanliness of operation, low fire risk, and small floor space. Some idea of their popularity will be conveyed by mention of the fact that Westinghouse air-blast transformers of more than 300,000 kw. combined capacity are now in operation in New York City alone.

PRODUCTION NOTES.

The ore receipts at the smelting works at Trail of the Consolidated Mining and Smelting Co. of Canada, Ltd., during three months ended March 31, ulto., were as follows:

	Lb.	Lb.
East Kootenay—		
North Star	496,816	
St. Eugene	3,372,493	
		3,869,309
Ainsworth division—		
Baltimore	12,211	
Spokane	338,886	
Trinket	60,361	
Whitewater	15,230	
Whitewater Deep	544,896	
		971,584

Nelson division—		
Arlington (Erie)	404,210	
Eureka	570,536	
Granite	52,485	
Hall Mines (matte)	260,146	
Hunter V.	513,546	
Kootenay Belle	69,081	
LaPlata	1,795,896	
Queen (Salmo)	130,007	
Queen Victoria	468,097	
		4,264,904

Slocan division—		
Colonial	76,148	
Jessie Bluebird	128,547	
Last Chance	408,244	
Lone Bachelor	256,577	
Midnight	15,968	
Northern Light	68,501	
Richmond	79,833	
Sunset	82,972	
Washington	44,877	
		1,161,667

Slocan City division—		
Lorne Doone	670,060	
Mountain Boomer	40,188	
Myrtle	26,180	
Ottawa	201,066	
Vancouver	120,516	
		1,058,010

Rossland—		
Centre Star	32,378,660	
Iron Mask	425,310	
Josie (Le Roi No. 2)	10,226,389	
Le Roi	36,409,179	
War Eagle	7,600,321	
White Bear	416,684	
		87,456,543

Boundary—		
Providence	774,712	
Sally	81,541	
Snowshoe	13,768,483	
Strathmore	43,198	
		14,667,934

Miscellaneous—		
Aberdeen	21,913	
Central	25,570	
Lightning Peak	41,758	
Refinery	912,020	
		1,001,261

Total

ROSSLAND.

The output of ore from Rossland mines for the first quarter of the current year was rather more than 62,000 tons. The Rossland Miner has published the following figures:

Mine.	Tons.
Le Roi	33,551
Centre Star group	19,842
Le Roi No. 2	4,890
Le Roi No. 2, concentrated	2,320
White Bear	255
White Bear, concentrated	1,200
Total	62,058

BOUNDARY.

The Phoenix Pioneer gives the following ore-production statistics for the quarter ended March 31:

Month.	Tons.
January	60,003
February	53,963
March	100,219
Total	214,187

The unusual severity of the weather experienced in January and March, and the shortage of railway cars for hauling ores and coke, together with the lack of sufficient fuel for mines and smelters, were accountable for the comparatively small production.

COAL MINING NOTES.

The Western Fuel Co. is erecting a sawmill at Harewood, near Nanaimo, for cutting timber for use at its coal mines.

The Norwegian steamer "Hornelen" of 7,000 tons register has been placed under charter to the Western Fuel Co. for one year. She will carry coal from the company's colliery to San Francisco, California.

The rapid progress being made in driving the tunnels at the Pacific Coal Company's Hosmer mines, which, so far, have proceeded without an accident, is a matter of remark among visitors and resident miners, says the Fernie Free Press.

The Armstrong Advertiser states that some coal from Nicola is being used on the Shuswap & Okanagan railway, two cars having been received. The engineers are said to claim that it is a splendid steam coal, with little ash and no clinkers.

The men employed at the coal mines at Lethbridge and Taber kept strictly out of the recent strike trouble. They are under term contracts and believed that their assistance at this juncture at the expense of a breach of faith would do actual harm to their fellow miners' cause.

Before the recent suspension of operations the Crow's Nest Pass Coal Co. was making progress with the work of opening a new mine, known as No. 11 and situated near the rock cut half way between Fernie and the Coal Creek mines. A tunnel had been driven between 200 and 300 ft. on a seam of about 5 ft. of domestic coal of good quality.

Several cars of fire-brick have arrived at Hosmer, Crow's Nest Pass, for the construction of test coke ovens for the Pacific Coal Co. at that place. The company intends shortly commencing the erection of a large boarding house for the accommodation of its mine employees, in accordance with plans already completed.

Several Spokane men have organized a coal company under the name of the Atlas Coal Mining and Coke Company for the purpose of developing 3,200 acres of coal lands near Lundbreck, which have been acquired. Offices of the company will be in Spokane. Exploration on the property has proved the occurrence on it of domestic, steam and coking coal. It is expected that the Atlas Company will put its coal on the Spokane market next winter.

At a meeting of the directors of the Diamond Coal Company, says the Calgary, Alberta, correspondent of the Labour Gazette, reports were presented calling for the expenditure of nearly \$300,000 in development of the company's property at Diamond City, six miles from Lethbridge. The contemplated development will be completed

in about 18 months, and includes the installation of a plant sufficient to raise 2,000 tons of coal per day, and a spur line to the projected Canadian Pacific Railway branch in the vicinity.

The Galbraith coal mine at Lundbreck, Alberta, has been purchased by Andrew Laidlaw of Spokane, Washington, for \$1,000,000. The mine has been shipping coal for years. It was acquired from the Hudson Bay Co. about 14 years ago by R. J. Galbraith. The Spokane *Spokesman-Review* says it is estimated there are between 2,000,000 and 3,000,000 tons of coal in the mine on the property. It is intended to incorporate the Galbraith Coal Co. with an authorized capital of \$250,000. Its headquarters will be at Spokane.

A press dispatch from Medicine Hat, Sask., states that the Rockford mines there, which fell into gradual disuse as the natural gas system was installed and extended, are reopening, and the management has made arrangements to supply the Canadian Pacific Railroad with 30 tons of coal a day, providing teams can be secured to haul it in from the mines, a distance of about four miles. The railway authorities are preparing estimates with a view of ascertaining the cost of constructing a spur line to the shaft, but the existence of a number of deep coulees will make this an expensive undertaking.

Development operations on the property of the Nicola Valley Coal and Coke Co., Ltd., continue and another contract for tunnelling has been let. So far the development work has been successful and proves the existence there of a large body of excellent coal. That taken from the tunnels as development proceeds is finding a ready market, and is giving much satisfaction. A pipe line from the Coldwater River is being laid. Machinery for the mines is on the way and soon a large number of men will be employed mining coal on a commercial basis, contracts having already been arranged with this end in view.

From the Nicola *Herald* it is learned that at the Diamond Vale Coal and Iron Mines, Ltd.'s, Diamond Vale mine the work of completing the construction of the necessary houses, offices, etc., is going steadily on, and the plant for operating the machinery is being placed in position. A dam has been put in to catch the logs which will be run down the river, the company having several million feet now in readiness for its sawmill, which will be in running order shortly. Owing to trouble with the work of sinking the shaft was stopped for a short period, but B. P. Little, assistant manager, now has things in shape for a resumption of sinking.

B. C. GAZETTE NOTES.

James R. Brown of Fairview, Okanagan, to be gold commissioner for the Osoyoos mining division. Appointment to date from February 1, 1907.

Howard A. Turner to be mining recorder for the Osoyoos mining division, with office at Fairview, Okanagan. Appointment to date from May 1.

The names of John Hirsch, of Victoria, and Harry Lyon Cummins, of Nelson, have been added to the annual list of registered members of the Corporation of Land Surveyors of British Columbia.

Reginald C. S. Randall to be mining recorder for the Cariboo mining division, with office at Barkerville. Appointment to date from May 1.

The Hon. Henry Esson Young, provincial secretary, to be acting minister of mines during the absence of the Hon. Richard McBride from the Province.

Francis H. Bacon of Golden, to be mining recorder for the Golden mining division, with recording office at Golden, from April 1, 1907, in place of F. C. Lang, resigned.

Rather more than one-third of the mineral production of British Columbia in 1906 was from the Boundary, the output of which district was between \$8,500,000 and \$9,000,000, chiefly in copper.

MINING MEN AND AFFAIRS

Blaszy Brothers of Vancouver, the Vancouver Valley mining properties at Otter Valley, Nicola district.

At the annual business meeting of the American Institute of Mining Engineers John H. Thompson of New York was elected president of the council.

J. C. Drewry, managing director of the Canadian Gold Fields Syndicate, Ltd., has returned to the Kootenay from Montreal, Quebec, where he spent the winter.

Superintendent R. Green of the West Canadian Collieries, Ltd.'s, Lille coal mine, near Frank, southwest Alberta, is away on a trip to Montreal and New York.

J. J. Campbell, general manager of the Hall Mining and Smelting Co., Ltd., lately made a business trip to Victoria, where he remained two or three days before returning to Nelson.

A. W. Geiger, lately assistant to the manager of the Alaska Smelting and Refining Company's smelter at Hadley, Prince of Wales Island, southeast Alaska, has gone to Nevada.

James Cronin of Spokane has returned from his visit to Ireland and has been looking over recent developments at the several mines in southern Kootenay in which he is interested.

James McEvoy of Fernie, East Kootenay, geologist and chief engineer for the Crow's Nest Pass Coal Company, has been recuperating at Victoria after an attack of pneumonia.

J. D. Sibbald of Revelstoke started for the McCullough Creek Co.'s hydraulic gold mining property in the Big Bend district, but had to return to Revelstoke, his feet having been injured while en route.

H. S. Sibley of Detroit, Michigan, and Capt. T. H. Trethewey of Nelson have been looking over coal lands on Livingston River, Alberta, owned by the Stamford syndicate, in which they are interested.

Norman Fraser, mine inspector for the province of Alberta, and E. Heathcote, district inspector, recently held at Frank an examination of applicants for certificates of efficiency as coal-mine fire bosses.

Laurent Muller has returned to Cariboo from Victoria. He will superintend the forthcoming season's hydraulic operations on John Hopp's placer gold mines in the neighbourhood of Barkerville, Cariboo.

The professional card of F. W. Groves, civil and mining engineer, of Princeton, who has an extensive knowledge of the Similkameen, obtained during several years of surveying and engineering in that district, appears on another page.

Blainey Stevens and H. D. Reynolds, who are interested in a large copper property in Alaska, have been investigating methods in vogue at the Granby Consolidated M. S. and P. Co.'s big mines and smelting works in Boundary district.

H. S. Reed, who has been superintendent of the crushing and concentrating plants at the Daly Reduction Co.'s stamp mill at Hedley, Similkameen, has resigned on account of ill health. Arthur Clare has been appointed to succeed him.

J. B. Hobson, general manager of the Cariboo Gold Mines, was at his home in Victoria during the latter part of April. Gravel washing for the season has been commenced at the company's big hydraulic gold mine at Bullock, Cariboo.

J. M. Turnbull of Trail, one of the mining engineers of the Consolidated Mining and Smelting Co. of Canada, Ltd., during April took a trip to the west coast of Vancouver Island for the purpose of examining a mining property there.

W. H. Aldridge of Trail, general manager of the Canadian Pacific Railway Co.'s mining properties and managing director of the Consolidated Mining and Smelting Co. of Canada, Ltd., will visit Toronto and eastern Canada early in May.

David Thomas of Princeton, geologist and

agent for the Crow's Nest Pass Coal Co., has gone to Toronto and other Canadian cities. He was accompanied by Mrs. Davies, and they may visit Virginia before returning to southeast Kootenay.

The *Rossland Miner* says: "The many friends of W. S. Keith in the Boundary and Rossland will be pleased to learn that he has been appointed to the position of superintendent of the smelter at Sumpter, Ore., owned by the Oregon Smelting and Refining Co."

O. L. Liegeart of Lille, France, who is a director of the Canadian Metal Company, has been visiting Frank, southwest Alberta, where the company has erected a zinc smelter, and the Blue Bell mine on Kootenay Lake, near Ainsworth, also owned by his company.

A. P. Low, director of the Geological Survey of Canada, has returned to Ottawa from a visit to Arkansas, Arkansas, U. S. A., convalescent after the serious illness that for several weeks incapacitated him from attending to the duties of his responsible office.

Captain T. H. Trethewey of the La Plata mine has resigned the management of that property to look after some mining interests in the coalfields of Alberta. His place has been taken by his son, W. J. Trethewey. Captain Trethewey remains a director of the La Plata company.

Chas. Dunderdale of London, a director of the Le Roi Mining Co., has returned to England after having visited that company's mine at Rossland and smelting works at Northport, Washington. Before coming to British Columbia Mr. Dunderdale went to Cobalt, northern Ontario, where he and associates are largely interested in mining properties.

News has been received at Rossland that Allan McLean, managing director of the Portland-Velvet mines, and director of the Rossland Kootenay Co., died recently in London, England. Mr. McLean was well known at Rossland, having visited that camp twice during the past three years, his last visit having been made about sixteen months ago.

W. W. Leach of Ottawa, one of the geologists of the Geological Survey of Canada, will go north early in May to continue the work of delimiting the coal and copper areas in the Telkwa Valley district in which he was engaged last year and on which he made the report published in the "Summary Report of the Geological Survey Department of Canada for 1906."

Richard F. Jones of Seattle is to have charge of mining operations on the Arctic Chief and Best Chance copper properties near Whitehorse, southern Yukon, under the direction of W. J. Elmendorf of Spokane, consulting engineer and manager for the owning company. It is stated that modern machinery will be installed and the mines worked on a comparatively large scale.

S. F. Parrish has removed from Los Angeles, California, to Tonopah, Nevada. Mr. Parrish's numerous friends in the Kootenay and Boundary districts of British Columbia will be glad to know that his residence on the Pacific coast, in California, during about a year and a half, has had a most beneficial effect upon his health so that he is now, to use his own words, "as good as new again."

Paul Johnson, who lately resigned the management of the Alaska Smelting and Refining Company's works at Hadley, southeast Alaska, left Seattle on April 30 by steamer for San Francisco, en route to Nevada. He will be in New York, accompanied by his family, about the middle of June, sailing thence for Europe about June 21. He will probably remain at Lund, Sweden, until late in the fall.

W. C. Thomas, for some time past superintendent of the Dominion Copper Company's smelter in the Boundary district, has been appointed the company's resident general manager, in succession to T. R. Drummond. Geo. Williams, for several years superintendent of the British Columbia Copper Company's smelter in the same district, is now filling a similar position at the works of the Dominion Copper Company.

O. A. Caldwell, chief accountant at Rossland for the

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Consolidated Mining and Smelting Co. of Canada at its Centre Star-War Eagle group of mines, has left Rossland for Van Trent, Placer county, California, to there fill a similar position at one of the Guggenheim mines. He will be succeeded at Rossland by E. G. Herr, formerly at the Trail smelter and for some months paymaster at the Centre Star-War Eagle mines.

T. A. Jagger, Jun., professor of geology in the Massachusetts Institute of Technology, Boston, is stated to be at the head of a party which arranged to leave Seattle, Wash., on May 1, for the Aleutian Islands to there study seismic and volcanic conditions. The party was to include Prof. H. V. Summers of Drexel Institute, Philadelphia; Prof. A. S. Eakle, mineralogist, University of California; Dr. E. C. Van Dyke and several scientists associated with Prof. Jagger in Boston.

Upon his retirement from the position of acting general manager for the British Columbia Copper Co., Ltd., at Greenwood, Boundary district, George F. Beardsley was the recipient of a presentation, made spontaneously by the company's smelter employees in acknowledgment of the pleasant and harmonious relations that had existed during the period he had been in charge. J. E. McAllister's health so much improved during his recent visit to Europe that at the beginning of April he was able to return to his duties as general manager with renewed vigour.

J. W. Astley, formerly superintendent of the Snowshoe mine at Phoenix, Boundary district, and afterwards general superintendent for the Le Roi Mining Co. at Rossland, who went to England for the benefit of his health early last year, intends shortly returning to British Columbia. Writing recently to a friend in British Columbia he stated that he planned to leave England on May 17 by the C. P. R. steamship "Empress of Britain." En route from Montreal to British Columbia he would probably stop over at Winnipeg a day or two and reach Van



EXAMINATION FOR ASSAYERS FOR LICENSE TO PRACTISE IN BRITISH COLUMBIA

AN EXAMINATION for Assayers will be held in Victoria on the 27th May and following days.

Entrance for any examination must be made in writing to the Secretary of the Board of Examiners, at least ten days before the date set for beginning of examination, and must be accompanied by the prescribed fee (\$15).

Any additional information desired may be obtained from Herbert Carmichael, Secretary, Board of Examiners, Victoria.

RICHARD McBRIDE,

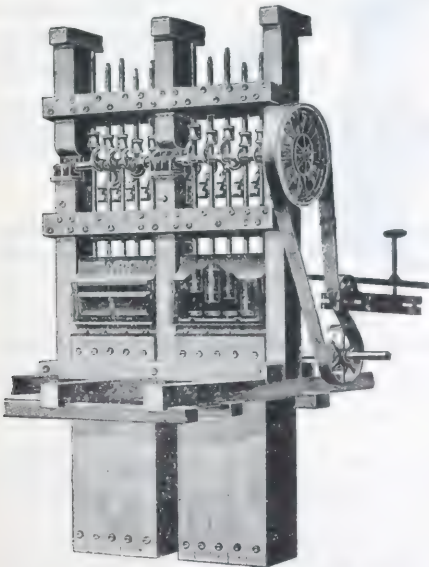
Minister of Mines.

Department of Mines,

Victoria, B. C., 15th April, 1907.

craver by the end of May. He may possibly make Victoria his headquarters hereafter.

O. E. LeRoy, who last year examined that part of the coast of British Columbia extending from the International Boundary north to Powell River and made the report thereon that was printed in the "Summary Report of the Geological Survey Department of Canada" for 1906, has resigned from the Survey. It is understood that this work will shortly be taken up by a gentleman who has been assistant to Dr. Frank D. Adams, professor of geology at McGill University, Montreal, Quebec. Mr. LeRoy has received an appointment with a mining company operating in the C. P. R. territory, and plans to leave



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NOTES AND COMMENTS.

The Canadian Marble and Granite Works, Ltd., has secured several contracts for the supply of marble and granite for use at Edmonton, Alberta, for the erection of school and other buildings.

The returns received from shipments of ore from the Richard III mine at Mt. Sicker, Vancouver Island, continue to be so satisfactory that the payment of a dividend in June will result.

At Revelstoke last month it was stated that a sale may be made of part of the property of the Prince Mining and Development Company, with the object of providing funds for the further development of that company's Standard mine.

A conference of geologists who have worked on the Pacific coast of Alaska was convened to be held in Washington, D. C., in April. The purpose of the meeting was to compare the stratigraphy of the coastal region from Cross Sound to Cook Inlet.

A newspaper announcement has been made to the effect that an oil refinery with a capacity for the treatment of 1,000 to 2,000 bbl. of crude oil per day will be built in Vancouver within three or four months, by the British American Oil Refineries, Ltd., at a cost of \$220,000.

White miners at Atlin have organized an association with the object of preventing Japanese from working on Atlin district mining properties. At last advice the Japanese claim that J. M. Robinson, who work on the hydraulic mines he manages had not been induced to leave the district.

A few weeks ago the London *Mining Journal* published the statement that Lord Strathcona, High Commissioner for Canada, had been informed by cablegram that "the mineral production of British Columbia in 1906 was equivalent in value to \$132 for every man, woman and child in the Province."

A new record of ore treated in any one month at the British Columbia Copper Co.'s smelter was made in April, in which month 34,239 tons of ore were smelted in two blast furnaces. The hearth area

of these furnaces is 48x240 in. Three were installed late last year, giving a combined capacity of about 2,000 tons per diem.

At Nelson early in May the action of G. B. McMillan against A. D. Wheeler and wife for \$25,000 commission claimed in connection with the sale of the Krao mine at Ainsworth for \$100,000, was dismissed by Mr. Justice Clement with costs against the plaintiff. This decision is generally regarded as an eminently just one.

The labour difficulties that had arisen at the Marble Bay mine, Texada Island, in connection with which the management had prosecuted four miners for breaches of the Industrial Disputes Act, have been amicably settled and an agreement reached concerning wages to be paid. Work in the mine will now be proceeded with.

The *Engineering and Mining Journal* notes that 'in the purchase of zinc ores the returning charges which have been made by European smelters on American, Canadian and Australian ores during the last two or three years have ranged from \$11.40 to \$13.16 per 2,000 lb., these figures corresponding to 53 to 60 marks or 65 to 75 francs per 1,000 kg.

The council of the Canadian Mining Institute has been endeavouring to ascertain the views of members concerning a proposal to hold a sectional meeting of the institute in British Columbia next September. No decision has yet been arrived at, but it is understood a majority of those who have replied to the council's circular of enquiry favour holding the meeting.

The tonnage of ore and concentrates received at the Trail smelter during April was 19,366 tons. Sources of production were as follows: Rossland, 11,346; Boundary, 4,228; Nelson, 1,750; East Kootenay, 1,747; Slocan, 183; Ainsworth, 49; Lardcan, 27; Refinery, 36. In addition 97 tons of lead-silver matte were received from Nelson. The aggregate tonnage for month was 19,463 tons.

The *Weekly Star* of Whitehorse, southern Yukon, said on May 10: Mining operations in all departments are now well under way in this locality. Surveyors are defining claim boundaries and prospectors are scouring the country in all directions. Crews are at work on several properties, notably the Pueblo, Copper King, Grafton and Arctic Chief, and summer activity may be said to be well under way.

A correspondent writing from Clinton intimates that a statement published in last month's MINING RECORD relative to platinum in the Fraser River "is all wrong." He informs us that platinum and other valuable minerals are found in the Fraser River from the mouth of the Thompson River to Big Bar, and they have been well known to occur in the sands

of the Fraser River for the last 12 or 15 years. His letter shall have further notice in next month's issue.

The National Trust Company has been advertising inviting offerings of Dominion Copper Company, Ltd., first mortgage six per cent. gold bonds, in which connection the company, in accordance with the requirements of its mortgage, dated June 1, 1905, securing the afore-mentioned issue, has paid out of its earnings the sum of \$170,000 to the National Trust Company, trustee under the mortgage, to be applied in the redemption of the bonds as provided by the mortgage.

The management of the Britannia Smelting Company's smelting works at Crofton, Vancouver Island, is overcoming the fuel shortage difficulty by obtaining imported coke. A shipment of 300 tons of New Zealand coke has been received and additional supplies are being obtained from other places. In future similar provision will be made so that whenever the Wellington Colliery Company shall be unable to supply coke the smelter will have from other countries enough to meet its requirements.

The Giant-California Mining Company, Ltd., has acquired the Giant and California mines at Rossland and Wm. Yolen Williams, who extensively developed the Granby Company's big copper mines in the Boundary district, has been appointed mine manager. Some years ago Mr. Williams was in charge of development work on the California, but this mine has lain idle ever since. The Giant was owned by an English company, which shipped 4,344 tons of ore from it before suspending operations in 1903. The amalgamated properties are situated a short distance west of the Le Roi and Le Roi No. 2 and are considered mines it will pay to work.

Following the settlement of the late strike of the employees of the coal mining companies of southwestern Alberta and the British Columbia section of the Crow's Nest Pass, the Crow's Nest Pass Coal Company, Ltd., has resumed work at its collieries at Coal Creek and Michel, but men are not yet obtainable in sufficient numbers to allow of working to full capacity. The directors have appropriated \$1,250,000 for further development of the mines and expansion of coal and coke business and arrangements will be made for carrying out their plans without unnecessary delay. Fully 500 more men will be required shortly; good coal miners in particular are needed.

Preparations are being made for the further enlargement of the ore-roasting equipment of the Hall Mining and Smelting Company's lead-silver smelting works at Nelson. The Huntington-Heberlein roaster and converters in use at these works since the end of last October have given satisfactory results so it has been decided to enlarge the plant by the addition of another roaster and more converting pots. The supply of ore during several months of the current

year has been fairly well maintained; in fact at times it has been in excess of the present capacity of the roasting plant, consequently enlargement has become necessary in order to keep the capacity of the works ahead of the ore supply.

The provincial government of Alberta has appointed a commission to investigate and report on all phases of the coal mining industry. The members are: Chief Justice SIMON, chairman; Lester Stockett, general manager of the Pacific Coal Co., Bankhead, representing the coal mine operators; and William Hanson, president of the Coleman miners' union, representing the coal miners. The duties of the commission are to make full inquiry into all matters and conditions relating to coal mining and to report thereon. The report will be used by the provincial government as a source of authentic information for its guidance in preparing laws for the regulation of the coal mining industry in Alberta.

The Dominion Government has published in the *Canada Gazette* the new regulations for the disposal of coal mining rights in the provinces of Manitoba, Saskatchewan, and Alberta; in Yukon Territory, North-west Territories, the railway belt in British Columbia, and within that tract in the Peace River district containing 3,500,000 acres acquired by the Dominion from British Columbia. Such rights will no longer be sold but may be leased for a term of 21 years at an annual rental of \$1 per acre payable in advance. Not more than 2,560 acres will be leased to any one applicant. In addition to the rent, a royalty at the rate of five cents per ton of 2,000 lb. will be levied and collected on the merchantable output of the mine.

The article on the Pacific Coal Co.'s Breaker at Bankhead, Alberta, printed on pp. 177-182 of this number of the *MINING RECORD*, gives a full and accurate description of this important plant and its work by the engineers under whose supervision it was installed. The prominence to which the Pacific Coal Co.'s Bankhead colliery is steadily attaining and the comparatively wide area over which its products are marketed, together attach to this installation a general interest, hence the reproduction in this journal of the article. Thanks to *The Engineering and Mining Journal* of New York, which with characteristic courtesy has kindly lent us the engraving blocks used to illustrate the descriptive matter, a clearer idea of the size and character of the big plant and of its operations is conveyed than would have been the case without the use of cuts. The establishment of this industry at Bankhead is one more significant testimony to the commercial and industrial expansion of Western Canada.

Toward the close of the exercises in dedication of the United Engineering Societies Building in New York on April 16-17, Dr. A. R. Leeson, past president of the American Institute of Mining Engineers and of the United Engineering Societies, was called

upon to present to Dr. F. E. Hutton, president of the American Society of Mechanical Engineers, Mr. Ralph J. Pope, secretary of the American Institute of Electrical Engineers, and Dr. R. W. Raymond, secretary of the American Institute of Mining Engineers, three gold medals, recently bestowed by the three societies, in recognition of the long service of these officers. Dr. Leeson presented each of these presentations with an appropriate sketch of the career of the recipient. Dr. Hutton replied for all three. The erection of the United Engineering Societies Building on its present adequate basis was made practicable through the munificence of Mr. Andrew Carnegie, who contributed \$1,500,000 for the purpose.

It is reported that the management of the Le Roi mine intends substituting electricity for steam as motive power for its two air compressors which combined have a capacity of 8,000 ft. of free air per min. at sea level. This plant has proved an economical one using steam, for a test extended over a period of 30 days under ordinary working conditions showed a coal consumption of 1.9 lb. per h.p. per hour, and that air was compressed to 95 lb. per sq. in. at a cost (exclusive of interest and depreciation charges) of \$1.59 per each 100,000 cu. ft. of free air compressed. Notwithstanding this, it is believed that electric power will be still more economical now that the West Kootenay Power and Light Co. has abundant generating capacity at its Bonington Falls station for all demands likely to be made on it. Should the Le Roi Co. use electricity for its air compressors its winding engines—one of 1,000, and another of 500 h.p. capacity—will not be required to compress air, using steam to reheat the air.

In looking through the long list of engineering and scientific societies and institutions of learning represented by delegates present at the dedicatory exercises of the United Engineering Societies Building in New York last month, the almost entire absence of representatives of Canadian societies and institutions is particularly noticeable, the single exception being the Canadian Society of Civil Engineers, which had a delegate present. In the list published in the *Monthly Bulletin of the American Institute of Mining Engineers* for the current month mention is made of the presence of representatives of institutions in Great Britain, France and Germany, but other than the one Canadian society above-named none in Canada appear to have been represented, and this is certainly a regret. It may be that the problem had before us is incomplete. If not we think it a matter for deep regret that a number of Canadian societies and institutions were so forgetful—we cannot think them intentionally lacking in courtesy—as to omit to be represented at a function of much more than ordinary interest to the Canadian mining and engineering community.

The H. H. Mining and Smelting Company has arranged to extend the tunnel on the Dandy mineral

claim into Silver King ground adjoining the Dandy. The carrying out of this work will involve about 1,200 ft. of driving, probably a year's work under local conditions. The eventual result of this work will be to unwater the Silver King mine down to something like 150 ft. below the present water level, and thus reopen the mine workings down to half way between the sixth and seventh levels. Meanwhile the extraction of ore above the fifth level will be continued. The further development of the Kootenay Bonanza claim—one of the Silver King group—is in progress by means of a short cross-cut from the old Kootenay Bonanza shaft, the object being to cut the ore at about 150 ft. below the surface. The Hall Mining and Smelting Company is now working the Silver King property on its own account, the agreement with M. S. Davys for joint working having been terminated some months ago. Since winter about 800 tons of ore of good grade, obtained during three or four months mining, have been shipped to the Consolidated Mining and Smelting Company's works at Trail.

The ninety-third meeting of the American Institute of Mining Engineers will be held at Toronto, Ontario, beginning on Tuesday afternoon, July 23, 1907. Prof. W. G. Miller, provincial geologist, Bureau of Mines, Toronto, may be addressed as the representative of the local committee in charge of the programme and excursions. The following programme is provisionally announced, subject to such changes as may be found advisable: Tuesday, July 23—Afternoon, session at the King Edward hotel; evening, reception in the Parliament buildings. Wednesday, July 24—Morning and afternoon, sessions; evening, departure by special train at 9 p. m. for Cobalt. Thursday, July 25—Visits to mines, and an evening reception in the Cobalt opera house. Friday, July 26—Additional visits to mines, and optional excursions in the afternoon to points of scenic or scientific interest. Saturday, July 27—Steamboat trip up Lake Temagami, or optional trips to mining districts. Sunday, July 28—To be spent by those who so desire at the hotels at or near the lake. Monday, July 29—Visit to Sudbury, etc., to be continued on Tuesday, the party returning to Toronto by train leaving Sudbury Tuesday night.

From a well-known Similkameen old-timer the following communication has been received by the MINING RECORD: "I send you in this letter a Post Office order for \$12. You sent me a bill two years ago for \$8, so by this time it must be \$12. You see I was hard up and have been very short of money for the past few years, but I have got a little money now and I am pleased to be able to send this to you. I thank you very much for dealing so patiently with me and will see that I do not again get behind in my subscription to your very valuable paper. I am just getting over heavy sickness of nine weeks and am still very weak. I wish you all kinds of good luck." In contrast to the honesty of this pioneer we think

of many who continued to accept delivery of our journal for years but persistently ignored periodical applications for payment, and whose names now adorn the "Doubtful Debts" pages of our ledger. Among these latter are men in professional and other prominent positions, yet they seem to lack the principle exemplified by the old pioneer in thus voluntarily paying his debt, while as to an expression of appreciation or goodwill—they are entire strangers to any such sentiments. The good wishes of our Similkameen friend are heartily reciprocated.

During recent weeks two mining men well known in British Columbia have been removed by death. These were Capt. W. H. Sandiford, for years manager of the Bosun mine on Slocan Lake, and Mr. J. W. Haskins, manager for the Rosella Hydraulic Mining Company developing placer gold property in Liard mining division, Cassiar. Capt. Sandiford opened and developed the Bosun which in the summer of 1899 he bonded for an English company—the North West Mining Syndicate—he represented. He continued to work this mine from July, 1899, to October, 1903, when difficulties of mining conditions prevailing in the Slocan district at that time rendered the continuance of operations at a profit impracticable. He remained at the mine until the autumn of 1904, when he removed to Victoria and thereafter resided in that city. It is noteworthy that the Bosun mine was the first mine in the Slocan to ship zinc ore as such. This product was shipped, to the extent of about 1,900 tons, to Antwerp, Belgium. In an article contributed to the MINING RECORD about seven years ago by the late Howard West, A.R.S.M., he mentioned the success of the North West Mining Syndicate, which declared a dividend of 20 per cent. as a result practically of its first year's operations, and stated that one of the factors which contributed to this success was "the unlimited confidence which they reposed in their local representative, Mr. W. H. Sandiford, who had full power to act for the company in any emergency which might arise. To his foresight and judgment, acquired during some twenty-five years' varied experience in every quarter of the globe, they owe a large measure of praise, and if there is one gratifying feature about the whole connection it is to know that his services to the country have been fully recognized by the directors and substantially acknowledged." The optimism and enthusiastic advocacy of the Cassiar country by the late Mr. Haskins doubtless did much towards establishing confidence that after railway transportation shall have been secured the mineral and other resources of the extensive area in the northeastern part of the Province will be proved valuable and important. He was a good friend to the outlying portions of Cassiar and it is a matter of general regret among those familiar with his tireless efforts to promote its interests that he did not live to reap the substantial reward that now appears to be almost within reach. Worthy pioneers, though in different fields of mining, were these men. Their work is done. *Requiescat in pace.*

NET EARNINGS AND DIVIDENDS OF THE CROW'S NEST PASS COAL CO., LTD.

THE ANNUAL REPORT of the Crow's Nest Pass Coal Company, Ltd., for the calendar year, 1906, is printed on another page of this number of the MINING RECORD. It will be seen that notwithstanding unfavourable conditions during a part of the year, the net earnings were sufficient to admit of the customary quarterly dividend at the rate of ten per cent. per annum being paid to the shareholders for the full period under review.

The publication of the company's yearly statement of accounts appears to have had its customary effect on its old-time traducer, Wm. Blakemore, who has repeated statements we have on former occasions shown to be untrue. His periodical ebullition has this time taken the following form:

"The Week was severely, not to say scurrilously, criticized a few months ago for pointing out that the Crow's Nest Pass Coal Co. were paying a higher dividend than the operating profits warranted. In the same editorial *The Week* also pointed out that practically all the money utilized in the payment of dividends had been acquired by the company through the sale of treasury stock at a high commission. The general management recently announced that a further issue of treasury stock at \$250 per \$100 share would shortly be made. As the issue is to be half a million it will, if sold, realize \$1,250,000 and a net premium of \$750,000. In view of the present financial position of the company it will be interesting to know what justification there is for putting this stock on the market at such a premium."

As to the question of whence dividends have been derived, the following figures from the company's audited balance sheets show:

Balance at credit of Profit and Loss	
Account on December 31, 1899.... \$	47,810.42
Net earnings for year 1900.....	141,064.10
" " " 1901.....	270,848.39
" " " 1902.....	171,285.80
" " " 1903.....	310,492.28
" " " 1904.....	406,049.56
" " " 1905.....	497,898.68
" " " 1906.....	351,791.35

Aggregate of net earnings to end of
1906 \$2,197,240.58

Total dividends, 1901... \$	212,705.50
" " 1902... \$	250,000.00
" " 1903... \$	303,717.36
" " 1904... \$	347,807.25
" " 1905... \$	349,418.05
" " 1906... \$	350,000.00

Aggregate dividends to end 1906... \$1,813,648.16

Balance at credit of Profit and Loss	
Account on December 31, 1906... \$	353,592.42

As explaining the smaller total of net earnings in 1906, the chairman of the adjourned annual meeting of shareholders held on April 30, said: "The company has passed a satisfactory year. Had it not been for the unfortunate strike which took place in the latter months of the year, the production would have reached approximately 1,000,000 tons, and profits of the company should have shown a betterment of \$125,000, which is the estimate the directors placed upon the cost of the strike. This is made up of loss in profits, and in the actual expense of the strike."

Concerning justification for the recently-authorized issue of new stock at \$250 per share, before leaving Winnipeg on May 30, Mr. G. G. S. Lindsey, managing director of the Crow's Nest Pass Coal Company, according to a press dispatch of that date, said: "My directors in Toronto have just given me an additional \$1,250,000 for the purpose of expanding and developing the property of the company, and the work will be begun as soon as the necessary arrangements can be made. We will need about 500 additional men."

The company's cash receipts on capital account, the investment of its Reserve Fund, and the big and very valuable assets, practically unencumbered, it possesses need not be gone into now. It has developed one of the most important individual enterprises established in the Province, and its achievements are constructive and a distinct public benefit.

Under date May 12, the president of the Stewwinder Gold and Coal Mining Company by circular gave the shareholders of the company the following information concerning operations at the Stewwinder gold mine at Fairview, Okanagan:

"In the past two months we have done the following development work: Raised from the 300-ft. level to within 20 ft. of the first level, a shaft 9 ft. x 4 ft. 6 in. within timbers (double compartment) and completed the timbering for this distance, 180 ft. Cross-cut from the old workings to the new shaft at the 200-ft. level a distance of 60 ft. Cross-cut on the surface at the side of the mill, to connect with the shaft at first level, a distance of 75 ft., size 8 ft. x 6 ft. diminishing to 7 ft. x 5 ft. within timbers. This makes 315 ft. of large tunnels and shafting completed in about two months, which is record time for this district. We are now completing the raise and will connect with the last-mentioned tunnel within a week. It will take about three weeks to raise the further distance of 50 ft. to the surface at the higher ground at the back of the mill and get the temporary galloways frame erected for hoisting while sinking the shaft, which will be continued immediately. We expect to sink at the rate of 100 ft. per month, and after the cross-cuts to the ore on the different new levels are made, we shall be in a position to extract ore with great economy through the new shaft, which is at the left hand side of the upper part of the mill. We are now driving all the machinery by water power and saving about \$200 per month in steam costs. The outlook in every respect is promising.

THE MARBLE BAY COPPER DEPOSIT.

By O. E. LeRoy.

TEXADA ISLAND was briefly noticed by Mr. LeRoy in his report published in the "Summary Report of the Geological Survey Department," for 1906 and reprinted in the *MINING RECORD* last February. In a paper prepared for Vol. X of the "Journal of the Canadian Mining Institute," Mr. LeRoy has written on the geology of Texada Island, as well as given information relative to the Marble Bay mine. The full text of his paper follows:

INTRODUCTION.

During a reconnaissance survey of part of the southern coast of British Columbia, in the summer of 1906, the writer had an opportunity of examining briefly the ore deposits occurring on Texada Island. One type of deposit is of particular interest, both on account of its being in a contact metamorphic zone and of its economic importance in containing valuable ores of copper. These deposits have previously been described in the reports of the provincial mineralogist for British Columbia, and in several papers by W. M. Brewer. In his later papers Mr. Brewer has drawn attention to certain deposits occurring on Gribbell Island, and in the Whitehorse District, Yukon Territory,* and shown that in mode of occurrence they are very similar to those on Texada Island.

The object of this paper in describing an example of this type is to again emphasize the economic importance of these deposits lying in widely separated areas, and to show that they are worthy of the careful consideration of those interested in mining.

GEOGRAPHICAL POSITION.

Texada Island, named by Elsa in 1791, lies in the Strait of Georgia, its south-east end being about 80 miles north of Victoria, and 47 miles northwest of Vancouver. The town of Van Anda, where the chief mines are situated, is about 75 miles from Vancouver and is a port of call for the steamers of the Union Steamship Co. The island has a length of 30 miles with a maximum width of $6\frac{1}{2}$ miles. High and mountainous throughout, especially in the eastern half where Mount Shepherd attains a height of 2,900 feet, it presents to the observer when viewed at a distance the appearance of part of a submerged mountain chain. The shores are very rugged, with bold cliffs fringed in part with narrow boulder beaches. Sand and gravel beaches are few and there are only three harbours, viz., Marble, Gillies and Blubber Bays, the two latter being somewhat exposed in certain winds.

GENERAL GEOLOGY.

The island is underlain by the Vancouver series of Dawson, part of which has been referred to the Triassic. There seems, however, to be an entire absence of fossils in the associated limestones, and part if not

all of the series may belong to the Paleozoic era. The series admits of two divisions. The lower is composed of chlorite and hornblende schists, tuffs, amygdaloidal lavas, porphyrites and agglomerates, which show over small areas obscure bedding. The upper division consists of limestone, varying from a massive thick bedded unaltered rock to a fine-grained pure white marble.

Subsequent to the deposition of the limestone there was considerable volcanic activity, and the whole of the Vancouver series was much disturbed by intrusions of diorite, gabbro, hornblende and augite-porphyrates and diabases. The relations of these rocks with the limestones are well seen where they have intruded as dykes, sills and irregular masses faulting and marbleizing the latter.

These igneous rocks, both older and younger than the limestones, have been much altered, and a large proportion of their present mineral content consists of secondary epidote, magnetite, chlorite, pyrite and calcite. They are widely developed and underlie the greater part of the island. The limestone, with the exception of a few small outliers, appears only at the northwest end where the exposure has a length of $7\frac{1}{2}$ miles, with a maximum width of two miles. In upper Jurassic times extensions of the great Coast Range batholith, consisting of granites and syenites, penetrated this older series and had a profound effect on them, producing schistose structure and shear zones in many of the igneous rocks, and converting the limestone to various crystalline types along with wide-spread faulting, as the discordant strikes and dips now show.

The coast batholith was followed by a great series of basic dykes, principally diabases and all the older rocks have been cut by them.

The Cretaceous has a limited exposure at Gillies Bay, consisting of feldspathic sandstones with calcite cement. The beds are probably basal, and are but slightly disturbed with low dips to seaward.

During the Glacial period the island was eroded by the Strait of Georgia glacier. A thin mantle of drift covers certain areas, composed of sandy boulder clay, the boulders being principally varieties of granite from the main coast.

In the general depression which followed, the island was much reduced in size, being some 400 ft. lower with respect to sea-level than at present.

ECONOMIC GEOLOGY.

In the early nineties attention was first called to the occurrence of free gold in quartz veins, and later, deposits of rich copper sulphides were found in the limestone. These latter were not considered of any great importance at the time, but subsequent development has proved the contrary. Both divisions of the Vancouver series contain valuable ore bodies, which are found in the eruptive rocks, at their contact with the limestone, and in the limestone.

In the eruptive rocks, the ores occur in shear and fracture zones with quartz and country-rock gangue. Much movement is shown by the slickensided walls, and later cross fractures are filled with calcite. The

* "Journal Canadian Mining Institute," Vol. IX, p. 39; *Engineering and Mining Journal*, 1902, Vol. 73.

ores are galena, fine blende, copper and iron pyrites, carrying as a rule low values in gold and silver. The ore is also very porous, and solid ore alternates with barren bones. The width of the veins varies from 1 to 4 ft., and one mine only, the Summit, has been proved to a depth of 360 ft. Other veins contain pyrite chiefly and have been noted for the rich showings of free gold in quartz. These, unfortunately, were only surface enrichments and had no depth, the pyrite immediately below being practically barren.

Contact deposits between the various igneous rocks and the limestone include the large and important bodies of magnetite situated on the south side of the island and owned by the Puget Sound Iron Co. On this property there is also a series of copper deposits—chalcopyrite and carbonates—along the contact of the limestone with the altered porphyrites or the magnetite. The ore occurs in rudely lenticular bodies lying at various angles from vertical to horizontal, the limestone being almost invariably the hanging wall or roof.

The important deposits of bornite and chalcopyrite, to which particular reference will be made, are found wholly in the limestone. At present two mines are being worked, the Marble Bay and Cornell. The Copper Queen, which was the pioneer mine of the

THE MARBLE BAY MINE.

In 1897, an insignificant outcrop of copper and iron pyrites with some bornite was found a quarter of a mile east of Sturt Bay, on a Crown-granted lot owned by Messrs. Christie and Palmer of Toronto. A shaft was sunk on the ore and drifts were run, but it was not until the 260-ft. level was reached that the ore body assumed a definite character.

In 1902, the property was purchased by the Tacoma Steel Co., for \$150,000, and it was extremely gratifying to the company to have been able in three years to pay the whole of the purchase price out of the profits earned by the mine. The mine is now 760 ft. deep and 715 ft. below high tide. The ore body from the 260-ft. level to the present workings has varied in length from 75 to 115 ft., and in width from a few inches to 45 ft. On the first floor of the 760-ft. level, it is 87 ft. long with a maximum width of 32 ft.

From the 140- to the 560-ft. level the ore body pitched north at a high angle, but from there to the 760-ft. it is practically vertical.

From the data collected this deposit may be described as an ore shoot occurring in a zone of brecciation in the crystalline limestone, this zone being approximately parallel to the strike. Divided into subordinate shoots above the 360-ft. level, it has, below that, been continuous. The borders are broadly irregular, and small stringers are given off which run a few inches into the country rock. In the upper levels the walls were brecciated and weak, but in the lower they are firm, and very little work is necessary in the way of lagging. The ore is bornite with subordinate chalcopyrite, and a little pyrite, pyrrhotite and molybdenite. These occur in a gangue made up largely of pale green pyroxene ("green-felsite") and reddish

limonite, with other fossils. The ore is either finely disseminated through the pyroxene, or occurs in small masses between the limestone. Very little is found in the garnet. A considerable proportion of the pyroxene gangue is partially altered, and disintegrates rapidly on exposure to the air. There are also large areas of the pyroxene which are practically barren. A microscopic examination of a few prepared sections of the gangue shows that the pyroxene (variety omphacite) occurs in mosaics of clear individuals with turbid borders. The garnet, which shows zonal structure and optical anomalies, is traversed by numerous cracks filled with turbid material, in part calcite. Towards the calcite, the garnet has a tendency to develop crystal outline. Bornite and chalcopyrite occur in small grains, solitary or connected in groups by narrow stringers between the pyroxene individuals, inter-grown with them, or along cracks in them and the garnet. Calcite with the larger grains of the sulphides, well formed garnets-andradite, and vesuvianite were the last to crystallize out and filled all the interstitial spaces.

Subsequent to the formation of the ore body it was cut by one of the later dykes of basic porphyrite. Between the seventh and eighth levels it varied in width from 4 to 6 ft. with ore on both sides. This dyke dipped to the south, and in its downward extension became much reduced in size. On the 760-ft. level it is only 7 in. wide and crosses the drift some distance south of the ore body. It is highly altered with a development of numerous fissures now filled with epidote, and pyrite. This intrusion caused considerable movements in parts of the ore body, and many small fissures were formed and subsequently filled with chlorite, pyrite and calcite. Some beautiful examples of slickensided surfaces are seen, especially where molybdenite occurs. The pyroxene and garnet have both been fractured and under microscopic examination the former showed strain shadows, incipient and complete granulation, with considerable alteration. Bornite has been redeposited along these lines of fracture, between individual grains, and along cleavage planes. It occurs in solitary and connected grains and parallel bands. Calcite of the first generation shows strain shadows, and the last phase in the formation of the deposit was the filling up of all the small interstitial spaces with calcite. The order of crystallization was pyroxene and garnet, simultaneously, along with the greater part of the bornite, then the remainder of the bornite in larger masses associated with well formed garnets, vesuvianite and calcite.

ORIGIN.

This deposit is closely connected with the intrusion of the coast granite and is clearly of pneumatolytic origin, being an example of the Kristiania type.*

*"Genesis of Ore Deposits"—Prof. J. H. L. Vogt, p. 648

"Trans. Amer. Inst. Min. Eng."—W. H. Weed, Ore Deposits near Igneous Contacts, Vol. XXXIII, p. 720.

mous quantities of aqueous vapours which in this case would have a profound effect on the limestone through which they would pass along zones of brecciation or bedding planes. The limestone has here been replaced by silicates rich in lime, and by sulphide ores with the consequent liberation of carbonic acid gas. With the exception of the lime and a small amount of magnesia, all the other constituents are foreign to the limestone and must have been brought up from below with the aqueous vapours.

An approximate analysis of the pyroxene gangue resulted as follows:

	Per Cent.
SiO ₂	55.25
Fe ₂ O ₃ and Al ₂ O ₃	6.50
CaO	25.00
MgO	14.50

Garnet (andradite) averages about 31 per cent. and vesuvianite about 35 per cent. of lime oxide.

The deposition of ore and gangue went on simultaneously with the cooling of the granite magma, and the ore body was formed before the intrusion of the aplite dykes. These dykes have not been found as yet in the Marble Bay mine, but they have been noted in two instances in the neighbouring deposits.

ORE VALUES.

The ore throughout is essentially high grade and carries good values in gold and silver. The ore which is finely disseminated through the pyroxene gangue carries much higher values in gold and silver, than the purer and more massive bornite and chalcopyrite. It has also been found that the percentage of copper has steadily increased with depth.

As it is necessary to mine considerable barren gangue which is intimately mixed with the productive, the ore is hand-sorted before shipping and graded into coarse and fines. The waste, on account of its fluxing properties, is shipped in large part and sold to the smelter. At present the total production is sent to the Tacoma smelter for treatment.

In order to ascertain the average value of the ore, the smelter returns for the year beginning in June, 1905, and ending June, 1906, were examined, with the following result:

Grade	Gold oz. per ton.	Silver oz. per ton.	Copper per cent.	Net value (dry) per ton.
Coarse ..	0.408	4.138	6.705	\$28.77
Fines ..	0.1673	1.569	1.602	\$6.88
Waste . .	Tr.-08	0.15-0.9	0.22-0.8	\$0.50
Coarse ..	1.066	5.73	11.25	.....

The last entry of coarse grade refers to a shipment of 116 tons made in July, 1906.

About 13,000 tons are mined annually, and approximately for every ton of coarse, two tons of fines and two of waste are shipped. Through the courtesy of F. C. Robinson, of the Sheffield Smelting Works, I am enabled to publish a few interesting assays which he made of the ore and gangue. The samples were taken from a stope on the 660-ft. level, and the gold and silver values are stated in ounces per long ton.

Assays		Analyses	I	II
Number.	Gold Silver.			
I.	0.40 18.60	Insoluble. . .	31.60	43.10
II.	1.05 7.85	Copper. . . .	34.00	13.60
III.	0.008 0.04	Iron.	10.30	9.00
IV.	0.025 0.07	Lime.	Trace	.....

I. Bornite and chalcopyrite, (massive ore).

II. Pyroxene and garnet gangue with finely disseminated bornite.

III. Calcite after removing mineralized portions.

IV. Calcite and garnet after removing mineralized portions.

Numbers III and IV are interesting in showing the occurrence of gold and silver in what was apparently barren gangue. Free gold in distinguishable leaves and grains has been found occasionally, but it is not a common occurrence.

SIMILAR DEPOSITS.

The ore shoots of the Copper Queen and Cornell mines adjacent to the Marble Bay are associated with basic dykes, some of which are older than the ore bodies. These are very much decomposed and in places have altered to a serpentine which carries ore, and is occasionally traversed by small veins of greenish white asbestos. The former mine has been noted for certain occurrences of free gold and argentiferous tetrahedrite. The deposits in the Whitehorse district, Yukon Territory, differ from the above, in that they carry low values in gold and silver, and higher values in copper. Their mode of occurrence, however, seems to be identical.

CONCLUSION.

The past development of these mines on Texada Island has proved the ore bodies to a considerable depth, the Copper Queen being 740 ft. deep, while a winze is now being sunk to the 860-ft. level in the Marble Bay. As regards the permanence of these deposits, there seems to be very little doubt they will continue until the limestone-granite contact shall be reached.

What is known as the "H" vein in the Le Roi No. 2 company's mine at Rossland is believed to have been discovered on the 900-ft. level. Drifting at that depth is in progress, and the vein is reported to be looking most promising. Average width has not yet been determined, but it is not less than 18 in. Assays so far give lower gold value than on the 700-ft. level, but copper is about the same, viz., 0.50 per cent. This discovery is regarded as important.

The Payne mine, group of mineral claims, concentrating mill, etc., situated near Sandon in the Slocan district, have been advertised for sale by auction in Montreal, Quebec. The company has for several years been in financial difficulties and operations on its property have been restricted to mining and milling on a small scale by lessees. The Payne was one of the earliest and most valuable locations made in the Slocan and during the mine's days of prosperity an aggregate of \$1,363,000 was paid in dividends.

PACIFIC COAL CO'S ANTHRACITE
BREAKER AT BANKHEAD

First Plant of Its Kind Erected in Canada.

By Lewis Storch and Bruce R. Warden.

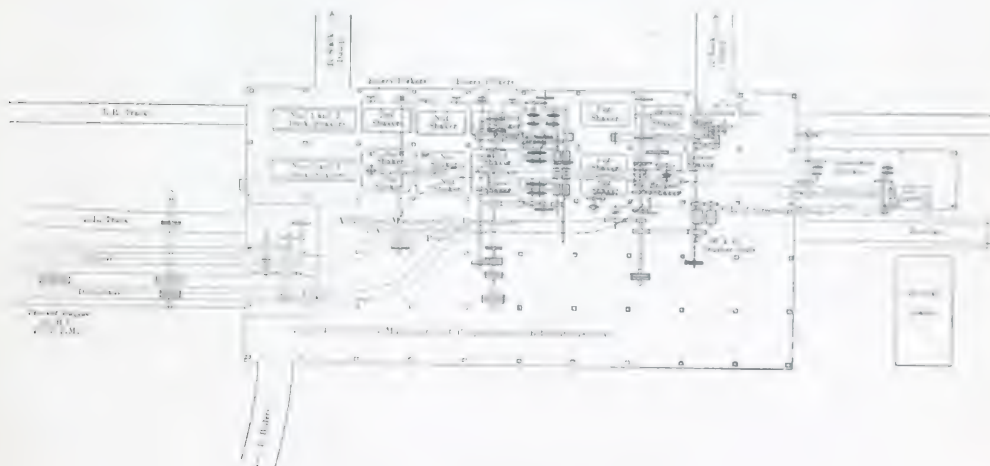
AT BANKHEAD, ALBERTA, there was erected in 1905 a modern coal breaker, which was described by Lewis Stockett, manager at Bankhead for the Pacific Coal Co., Ltd., and Bruce R. Warden, engineer, in a paper jointly contributed to the "Journal of the Canadian Institute, 1906," Vol. IX, as follows:

"The coal breaker recently erected for the preparation of the anthracite coal mined by the Pacific Coal Company may be a matter of interest to mining men, and should be a subject of pride to Canadians, as it is the first plant of this kind to be erected in Canada.

Moisture	Per Cent.
Vol. (lit.)	1.00
Free Carbon	8.00
ash	1.00
.....	1.00
Specific Gravity	1.40
.....	1.00
British Thermal Units	14,000

"In the preparation of anthracite coal, machinery is required to screen out all the dust, remove all the impurities, such as rock, sulphur balls, slate and bony coal, and separate it into several sizes. These sizes, conforming very nearly with the practice of the anthracite collieries of Pennsylvania, are divided as follows:

- Broken, through 3-in. bars and over $3\frac{1}{4}$ -in. round holes.
Egg, through $3\frac{1}{4}$ -in. holes and over $2\frac{1}{4}$ -in. holes.
Stove, through $2\frac{1}{4}$ -in. holes and over $1\frac{1}{2}$ -in. holes.
Nut, through $1\frac{1}{2}$ -in. holes and over 1-in. holes.



Plan of the Pacific Coal Company's Breaker.

"The geology of the field in which the Bankhead colliery is situated has been described in other papers; it is not therefore the purpose of this article to give any description thereof. Seven of the seams in it have been developed up to date, and a cross-cut tunnel driven across the measures will develop the remaining beds, the prospecting work having shown that there are at least twelve seams in the basin. Of the seven opened up, four are being worked; one is used for the main haulage road and air courses and two are not being worked on account of the friability of the coal and the large percentage of the smaller sizes they make, the market for which is at the present time somewhat limited, but is being extended as the proper appliances for burning these small sizes under boilers are put in.

*An average analysis of the coal is as follows:

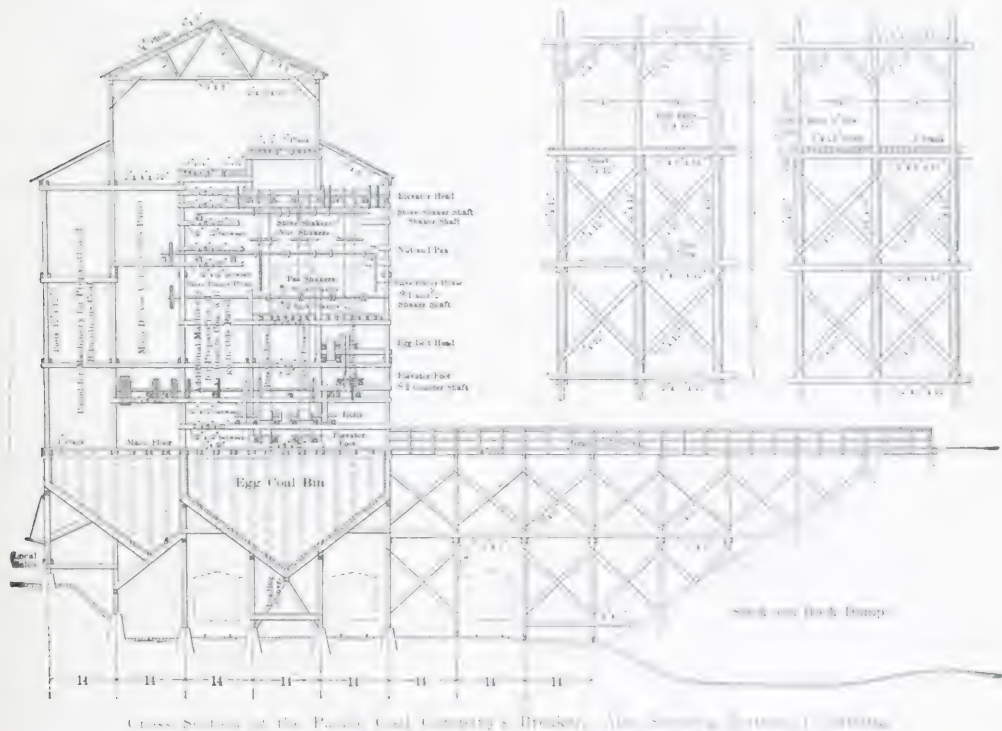
- Pea, through 1-in. holes and over 9-16-in. holes.
Buckwheat No. 1, through 9-16-in. holes and over 5-16-in. holes.
Buckwheat No. 2, through 5-16-in. holes and over 1/4-in. holes.
Dust, through 1/8-in. holes.

tracks) by means of an endless chain, travelling 60 ft. per min., with hooks spaced 30 ft. apart, to engage the axles of the mine cars. This will deliver two cars per min. The capacity of these cars is something over two tons, giving a capacity of 2,000 tons per day of 10 hours, which can be increased by spacing the hooks 20 ft. or even 15 ft. apart as may become necessary. The empty mine cars are returned down the incline by another endless chain, travelling at the same speed and with hooks spaced 12 ft. apart, to which they are fed by an auxiliary chain so arranged that as the cars are delivered to the main chain a hook is waiting in readiness for each car and the car is delivered to the chain without shock. The

has a capacity of two tons at one revolution, of three tons per min., and 1,800 tons in 10 hours.

THE COAL BREAKERS

"On the platform the material is sorted and the rock and slate pushed into the rock bin, the coal is separated, the lumps of pure coal going through a set of rolls and being broken up into marketable sizes, and the lumps containing a portion of bone or slate through another set of rolls to be broken and broken up and to allow the removal of the pieces of bone and slate. These rolls revolve at 90 r.p.m., are 36 in. in diameter, and 36 in. long, and have inserted steel teeth $1\frac{3}{4}$ in. square and $3\frac{1}{2}$ in. long, spaced 4 in. apart and set diagonally.



Cross Section of the Pacific Coal Company's Breaker, Also Showing Layout of Building.

grades of the track are such that the car handles itself, from the time it leaves the top of the uphaul chain until it arrives at the top of the downhaul chain. The tracks at the bottom of the incline also have their grades arranged so that the loads feed into the bottom of the incline and the empties run away from it.

"The coal after passing over a scale which weighs it as it passes, is dumped by means of a crossover tippie, into a dump chute, and fed by an automatic feeder regularly over a set of screen bars with 3-in. spaces on to a platform. This automatic feed revolves $1\frac{1}{2}$ r.p.m., and has four compartments, each of which contains about 1,000 lb. of coal, so that it

"From here we have three separate and distinct streams of coal, which, on account of their different characters, require different treatment, and by keeping them separate until they reach the loading bins, to be loaded into the railroad cars, they are enabled to get the preparation they require.

"The 'bone coal' as it is called, goes to the mill, mostly only screening to take out the dust made in the breaking, and to separate it into the different sizes, any pieces of slate or bone which are present being removed by hand.

"The 'bony coal' not only requires this, but also thorough cleaning of the pieces of slate and bone; this is accomplished in the broken and egg sizes, by pass-

ing from the screen on to a picking band, from which the impurities are removed by hand picking, the rock and slate going into a conveyer which takes it to the rock bin, and the pieces containing both coal and slate or coal and bone to another set of rolls to be broken up smaller, so that the coal can be saved in the smaller sizes.

THE SMALLER SIZES.

"What remains after the broken and egg sizes are taken out is elevated to the top of the building and, passing over another set of screens, is separated into stove, nut, pea, buckwheat Nos. 1 and 2 sizes, the dust going into the dust bin, to be hauled out and

The No. 2 buckwheat is found to be sufficiently clean without any further preparations, and goes direct to the bin.

"The 'mine-run' coal, that portion which passes through the 3-in. bars above the platform, is conveyed to the broken screen by means of a chute, the bottom of which has $\frac{1}{4}$ -in. square perforations to remove the dust, which falls into the dust bin; the broken screen removes the broken size, the remainder passing over 3-16-in. round perforations on the bottom of the broken screen, which removes the remaining dust. This broken coal joins the broken coal from the 'bony coal' stream on the same picking band

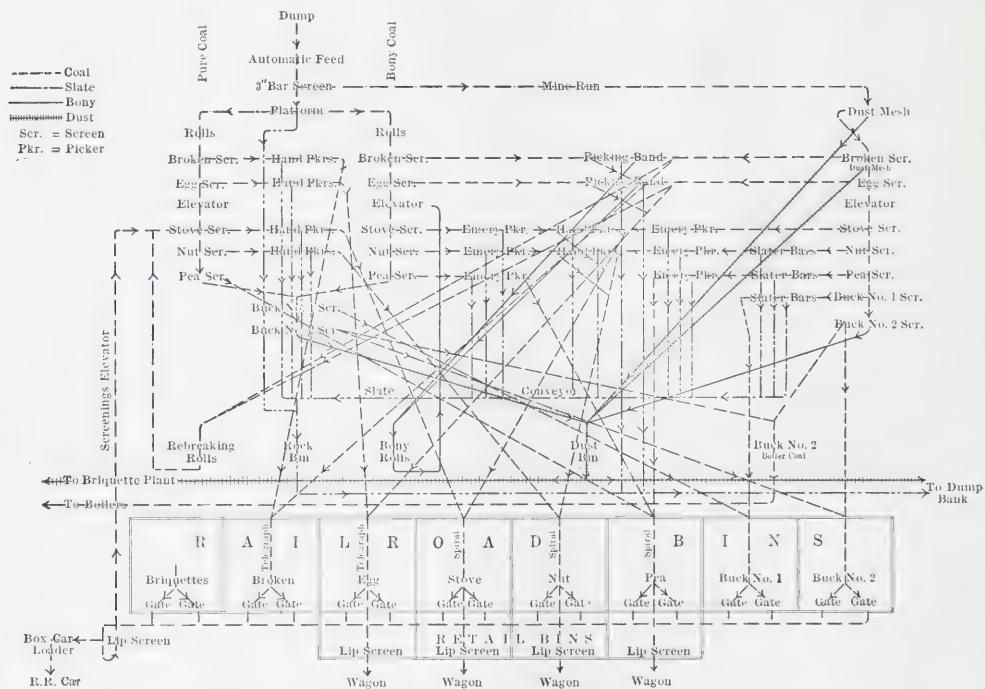


Diagram Showing Method of Preparing Anthracite at Pacific Coal Company's Breaker.

dumped on the waste bank at the present time; later on, a briquet plant is to be erected to briquet this dust. The stove coal, after it leaves the screen, goes over a mechanical picker, known as the 'Emery' picker, which removes the slate and bone. The coal from this picker and also the refuse are picked by hand to save any coal that may be thrown out with the slate, and to remove any pieces of slate which the machine has failed to remove. The coal then passes to the bins, and the refuse to a conveyer to be conveyed to the rock bin. The nut and pea coals are similarly treated, with the exception that with the pea there is no hand picking. The No. 1 buckwheat, as it leaves the screen, passes over slater bars which remove the flat pieces, and as these flat pieces are nearly all slate, cleans the coal with very little loss.

to have the refuse removed. The egg size has similar treatment, and the remainder is elevated to the top of the building, to go through a like treatment as the 'bony coal' stream, with the exceptions that, containing a larger proportion of impurities, it has double the number of Emery pickers and hand pickers, and the nut and pea sizes pass over slater bars which remove the flat pieces.

"The screens on the 'mine-run' side are 6 ft. wide and 12 ft. long, with the exception of the buckwheat screens, the No. 1 being 5 ft. wide and 18 ft. long, and the No. 2 6 ft. wide and 18 ft. long. Those on the 'pure coal' and 'bony' sides are $4\frac{1}{2}$ ft. wide by 12 ft. long, with the exception of the buckwheat screens, which are the same size as those on the mine-run side. They are built of steel plates and angle iron, sus-

pened on 5/8-in. chains and are driven by eccentrics having 6 in. travel and running 100 r.p.m. The pitch of the screens is 2 in. per ft.

"The 'mine-run' elevator is of the continuous-discharge type, with collecting shafts to give a mass per foot discharge; having buckets 24x12 in., each bucket containing 80 lb. of coal when level full, the speed is 60 buckets per min., giving a capacity of about 2 1/2 tons per min., or 1,500 tons per day of 10 hours. The 'pure' and 'bony' coal elevators are of the same type as the 'mine-run' elevator and both alike as to size, having buckets 16x8 in., containing 22 lb. of coal when level full, and at a speed of 100 buckets per min., give a capacity of one ton per min., or 600 tons for the 10 hours. The combined elevating capacity of the three elevators is 2,700 tons per day of 10 hours.

REMOVAL OF SLATE.

"The material to be separated is fed over the inclined chutes by feeders. The lower ends of these chutes are slate slabs, and as the material is fed over them the difference in the specific gravity of the coal and of the refuse, and also the difference in shape, causes a difference in the friction, that of slate being the greater as it passes over the slate slab, which retards the movement of the slate so that it falls into the opening and thence into the slate chute, the coal acquiring velocity enough to jump the opening at the bottom and pass on into the coal chute. Both the pitch of the slab and the width of the opening are readily adjustable by means of levers, and these are adjusted to meet the requirements of the coal and changed when found necessary. The feeders oscillate 65 times per min., and it is to this regularity in the feed that the success of the machine is largely due. The capacity of each picker is 100 tons per day of 10 hours.

"The slater bars are set on the end of a screen, or in a chute, where the coal can slide over them. The flat pieces fall through the narrow openings, and as nearly all of the flat pieces are slate, by getting the proper width of opening all of the flat slate is removed, leaving those pieces of slate which are the same size as the pieces of coal to be dealt with by the Emery picker and hand picking.

"The hand picking is done on picking bands for the larger sizes and on inclined chutes set at pitches varying from 4 to 5 in. to the foot for the smaller sizes. Chinamen and boys are employed for this purpose.

THE LARGER SIZES.

"A set of re-breaking rolls, 24 in. in diameter and 36 in. wide, with 1 1/4-in. square steel teeth 2 in. long, set diagonally and spaced 3 1/4 in., revolving at 133 r.p.m., is provided for re-breaking the broken and egg sizes into stove and smaller sizes when the market conditions are such that a larger proportion of these sizes is required than is ordinarily made.

"A set of bony rolls of the same diameter and width and running at the same speed as the re-breaking rolls, with steel teeth 1 in. square and 1 1/2 in. long, set diagonally, and spaced 1 15-16 in., is provided to break up the pieces containing both coal and

bone or coal and slate, picked from the broken and egg-picking bands.

"The material from the re-breaking rolls is elevated in the pure-coal elevator to the screens above, to be separated into sizes, and the material from the bony rolls is likewise elevated in the bony elevator to the screens above, to be separated into sizes and cleaned.

"The stove, nut and pea sizes, after preparation, are conveyed into the bins by means of spirally inclined chutes to save the breaking of the coal. These inclined chutes extend from the top to the bottom of the bins, and the coal slides down them until it reaches the pile of coal in the bottom of the bin or wherever it may be. The broken and egg sizes are conveyed to the bin by straight inclined chutes, called telegraphs; it having been found that the spirally inclined chutes would not work well with these larger sizes.

CONVEYERS.

From the bins the coal is drawn out through gates to a belt conveyor, 36 in. wide and running the full length of the building at a speed of 150 ft. per min., which conveys it to a lip screen set on an inclination, with different sized perforations for the different sizes of coal. This screens out any dust and smaller sizes that may be in the coal before it passes into open cars direct or to the box-car loader, to be loaded into box cars. From this lip screen an elevator conveys the screenings to the top of the bins, where a conveyor takes it to the pure-coal elevator, to be elevated to the screens above and separated into such sizes as it will make.

"This lip-screen elevator is of the same size as the bony and pure-coal elevators, simply not to have too many different-sized pieces of machinery, but is run at one-half the speed.

"The screenings conveyor is a flight conveyor, working in an iron trough with 16x8-in. flights every 36 in., and having a speed of 100 ft. per minute.

"The slate and other refuse from the various picking machines and hand pickers slide by gravity into a flight conveyor, similar to the screenings conveyor, except that the flights are spaced 18 in. apart, giving double the capacity.

"The box-car loader is the Victor loader, and is run by its own engine with steam from the main boiler plant.

"Power is furnished for all the rest of the machinery, including the hoisting on the incline, by a 16- and 28x36-in. cross compound horizontal engine, running at 100 r.p.m., using steam at 120 lb. pressure in the high-pressure cylinder and capable of developing 350 h.p.

"All of the drives are 1 1/2-in. Manila rope, except a few short drives where rubber belting is used. The main drives are continuous ropes with tension carriages, and the side drives are loops, the plan being followed of putting one more loop on each drive than was necessary, so that in case of one coming off or breaking, the plant could still continue to run. Splicing and shackles of different kinds have been tried

on the ropes with the result that the splicing, while troublesome until a rope gets stretched, and taking longer to make, has been found the most satisfactory. All of the main lines of shafting in the breaker run at 100 r.p.m., from which the required speeds for the different machinery are made by a difference in the size of the pulleys or rope wheels, and where a very slow speed is needed, by pinions working into larger spur wheels.

BUILDINGS, ETC.

"The foundations of the building and machinery are all of concrete, the gravel and sand for which were had from the excavations. Eight hundred and fifty barrels of cement were used. The posts of the building and inclines rest directly upon piers.

The timber used was coast fir, about 1,000,000 ft. b.m. being used; no mortises and tenons, gaining or dapping were used, and the style of framing may be described as continuous posts, spliced together, with all cross timber, braces, etc., bolted on, these timbers when necessary being further supported by wooden brackets bolted on. As a square, crosscut saw, auger, hammer and monkey wrench were the only tools used, it gave a quicker and cheaper method of erecting. There is not the settling due to rotting of mortises and tenons, the drying out of the timber or the load being carried across the grain of the wood. There is also a great stiffness, which in a building of this kind, where there is so much moving machinery and vibration resulting therefrom, is necessary. As the timber dries out, all that is needed is to go over the bolts and tighten them up. The building has proved to be solid and free from shaking, either from the movement of the machinery, or the wind pressure from some severe winds which have occurred since erection.

"The building is heated by direct steam in coils of 2-in. pipe, about 5,000 lin. ft. being used for the purpose. The lighting is done with 16-c.p. incandescent electric lights, about 200 being used. For fire protection there are two fire plugs on the outside of the building, with two connections on each plug for 2½-in. fire hose, the water pipes having a head of 400 ft. Also two stand pipes, one at each end of the building, with hose connections at three different heights, having a hose and nozzle always attached and requiring but the opening of a valve. Sixty fire buckets set in convenient racks and standing full of water are ready for immediate use on the breaking out of a fire.

"The rock and dust are hauled out over trestles in iron dump cars holding 1½ tons each by a 6x10-in. compressed air locomotive, weighing 5 tons, to the waste bank. The dust will later be taken by a flight conveyor to the briquetting plant, and the resulting briquets returned to the breaker by the same method.

"Every car of coal is sampled and tested for the percentage of slate, bone and small sizes contained in it; if it does not come within the following table of standards adopted by the Pennsylvania anthracite market, it is unloaded into the breaker to be cleaned:

	Slate	Bone	Undersize
Broken	1	2	0
Egg	2	2	0
Stove	4	3	0
Nut	5	5	15
Pea	10	..	15
Buckwheat No. 1.....	15	..	20
Buckwheat No. 2.....	..	..	30

Duplicates of all the pieces of machinery which are liable to break or wear out have been provided and are kept conveniently placed so as to be quickly put in.

Excavation was commenced.....	April	3, 1905
Foundations were commenced.....	April	14, "
Framing was commenced	May	27, "
Erection was commenced.....	May	31, "
First machinery placed.....	July	24, "
Foundations finished.....	July	25, "
Erection finished.....	Oct.	14, "
Machinery finished.....	Oct.	28, "
Breaker tried.....	Nov.	6, "
Breaker started up.....	Nov.	13, "

The cost of the breaker and incline is shown in the table below:

General expense	\$ 3,076.73
Labour	34,829.35
Lumber	15,709.97
Cement	4,238.90
Iron and Hardware	6,209.34
Machinery	30,262.45
Freight	17,314.19
Duty	4,740.08
Power, tools, etc.	815.66
Pipe and fittings	1,561.72
Electric supplies	317.19
	\$119,173.58

"The force required to man the breaker is as follows:

Breaker engineer	1
Oiler	1
Bottom man	1
Car oiler	1
Spragger	1
Top man	1
Weighman	1
Dumpers	2
Platform men	5
Screen men	6
Emery picker men	3
Hand pickers	35
Dirt bank men	4
Locomotive engineer	1
Locomotive switchmen	2
Laborers	5
Box car loader engineer	1
Box car loader men	4
Foreman	1
Carpenter and repairman	1
Weighman	1

"The breaker will not be complete until another side of mine-run machinery shall have been installed, which will require another dump, bar screen, platform, screens and elevator; it will then be abundantly able to handle 2,000 tons of material per day of 10 hours. After the additional mine-run machinery shall be installed, there will still be a vacant panel in

the breaker and also a set of bins; these are being reserved for bituminous coal, the prospecting having shown that there are bituminous veins on the property which will be reached in time. We will then have something unique in coal preparation; that is, both anthracite and bituminous coal from the same mine and loaded from the same building."

UNUSUAL FEAT OF TRANSPORTATION

Providence, Conn., Feb. 26 (C. M. M.)—The

PACKING LOG CABLES—A most remarkable feat is now being accomplished. The average diameter and weight are 12 in.



Pack Train of 11 Horses Carrying Log Cable.
Length of Cable 3,600 ft.; Weight 7,600 lb.

The total value of the gold produced in British Columbia to 1906, inclusive, is officially stated at nearly \$110,000,000—placer \$68,000,000 and lode \$41,000,000.

The Mining Society of Nova Scotia has decided to ask the government to employ a competent man for one year to report upon copper and fire clay deposits of the province.

means small with loads that can be carried by two or three horses or mules, but when as many as thirty-one animals have to be used to convey a single cable the task is indeed a formidable one, more particularly when such a heavy cable is being used for the service tramway cable which must not have a "kink" in it or it would be unsuitable for elevated tramway purposes. E. J. Bradford & Co. of Chatham, N. H., is situated in that part of northern Lardeau known

as Fish River camp, last autumn successfully accomplished what may fairly be regarded as a series of unusual feats in transportation. Brief particulars of that firm's successful conveyance of several cables from Camborne to the terminals of the aerial tramway from Camborne up to the Silver Dollar mine were obtained by the editor of the *MINING RECORD* when he visited that camp last October, but it was only recently that permission was obtained to reproduce a photograph of the long pack train shown in the accompanying illustration, so publication of the following information has been delayed from month to month until the photograph should be received.

Last summer the Crawford Double Rope Aerial Tramway System, Ltd., of Nelson, B. C., contracted with the Elwood Tinworkers Gold Mining Co., of Elwood, Indiana, U. S. A., to supply and erect the aerial tramway above-mentioned. The construction of this ropeway involved more difficulty than is ordinarily met with, since all material other than timbers for the derricks had to be packed up the mountain from Camborne, there not being wagon-road or other suitable means of communication. Messrs. Branford & Co. undertook to convey this material to its destination, and some idea of the magnitude of the work may be obtained from the following facts: On one day a traction cable weighing 1,814 lb. gross was conveyed on nine packhorses about six miles to the site of the upper terminal of the tramway, the altitude of which is about 2,000 ft. above Camborne. On the two following days two $\frac{7}{8}$ -in. cables, length 6,900 ft., weight 4,900 lb., were taken on 20 horses, also to the upper terminal. The fourth day's achievement was the packing on 23 horses of 3,400 ft. of 1-in. cable, weighing 5,000 lb., to the site of the lower terminal of the tramway. On the fifth day 3,600 ft. of cable, weight 5,700 lb., was taken to the upper terminal on 25 horses. The sixth day's work was the delivery at the lower terminal of 3,400 ft. of $1\frac{1}{8}$ -in. cable, with 27 horses, carrying the 7,200 lb. weight. On the last day the pack train of 31 horses, shown in the illustration, carried 3,600 ft. of $1\frac{1}{8}$ -in. cable, weighing 7,600 lb., to the upper terminal. All these cables were taken over a rough mountain trail and delivered in good order.

The photograph here reproduced is one of several taken for the Crawford Double Rope Aerial Tramway System, Ltd., by E. F. Tucker of Arrowhead, whose courtesy in placing it at the disposal of the *MINING RECORD* is acknowledged with thanks.

TAMARAC GROUP, HIGHLAND VALLEY.

HIGHLAND VALLEY, in the Ashcroft district, has mineral showings which have attracted the attention of a number of mining men from time to time. As yet, though, there does not appear to have been much development work done in that camp. The locality was visited lately by a representative of the *Ashcroft Journal*, who thus describes the Tamarac group:

"The Tamarac group of copper properties is situated about three miles from Fish Lake, up Highland Valley. The group consists of 8 claims: The Tamarac, Star, Shamrock, May L., Duke, King, Billy and Major.

"Outside of the yearly assessment work the bulk of the development has been done on the Tamarac, where three shafts have been sunk, aggregating about 85 ft.

"At first the Tamarac was worked as a molybdenite proposition and a considerable quantity of that mineral was taken out and shipped, while several tons are still lying in the dump. At about 30 ft. down, however, the molybdenum is playing out and its place is being taken by copper. Work was suspended here, and another shaft sunk at a different point and on a different vein, in which there is a 3-ft. vein of copper sulphides exposed. The two veins on which this work was done cut the formation at right angles.

"The shaft now being sunk is on still another vein which cuts the formation diagonally. The shaft is about 6x8 ft., and at the bottom the ore is 4 ft. in width, lying 3 ft. from another paystreak occurring toward the hanging wall of the vein. It is not known just how thick this second paystreak is, but the quartz which forms it is heavily impregnated with bornite and copper glance and runs 16 per cent. copper.

"The other vein which lies toward the footwall projects 4 ft. into the shaft and is of unknown extent. The material composing this is solid sulphide ore without a trace of quartz in it—that is, at the bottom of the shaft—where three ore sacks of samples were taken. This vein does not show on the surface, but comes in about 7 or 8 ft. below.

"On this property there are seven ledges, all within a width of 300 ft., but until more work has been done it is not possible to say whether they are all one enormous vein reaching the surface through cracks at different points and all springing from the one parent vein, or parallel veins. Not one of them, however, is barren—all contain ore.

"On the Shamrock which lies about 400 ft. from the shaft on the Tamarac an open cut of 6 ft. exposes a streak of ore which runs 9.6 per cent. copper. The vein on the Shamrock is a continuation of the Tamarac veins and would indicate that the values hold out to a remarkable distance.

"Besides having a showing of copper ore, the Tamarac group is well supplied with mine timber; a wagon road can be built to the property at very small cost; and within a mile of the shaft-house there is one of the best water-powers in this section of the country. A good wagon-road already extends to within a mile of the workings, and the mine is located about 15 miles from the Canadian Pacific Railway. It is about 30 miles from Coutlee, where coal mines are located. This will mean much to the operators of this mine in the future."

Zinc Resources of West Kootenay.

Particulars of Occurrences of Zinc Ore in a Number of Mines Worked for Silver and Lead.

PRODUCTION OF ZINC in British Columbia may be expected to hereafter show a decided increase consequent upon the decision of the United States board of general appraisers, made public early in the current year, that the market of that country is to be open to foreign zinc ores free of duty. There are numerous mines in East and West Kootenay districts to which this decision is of much importance. Most of these were visited by one or other of the experts to whom was entrusted the work of investigating the zinc resources of British Columbia and reporting thereon to the Dominion government. From time to time the MINING RECORD has reprinted from the "Report of Zinc Commission" descriptions of some of the mines officially reported on. Last October descriptions of the Highlander at Ainsworth, and several properties on the south fork of Kaslo Creek, were in this way given additional publicity, while the Lucky Jim mine, situated in the eastern part of Slocan mining division, had similar notice last February. This month the report of Mr. A. C. Garde, assistant engineer in the field, to the chief commissioner on a number of mines and prospects examined by him independently in connection with the zinc resources investigation, is reprinted, as follows:

SLOCAN DIVISION.

The group of mines on Reco Mountains includes several well-known silver-lead mines, situated at elevations ranging from 5,000 to 7,000 ft. above sea level, on the southern slope of the steep mountains directly north of Sandon and Cody. Of these properties I visited the American Boy, the Noble Five, the Reco, and the Goodenough—Grey Copper. My examination was limited to the properties wherein the production of zinc blende promises to become of economic value.

Broadly speaking the veins of this district parallel each other at distances generally not over 500 ft. The formation consists of the usual Slocan gneiss series, rather thinly bedded and frequently interrupted by intrusive dykes older than the veins and varying in thickness from a few feet to several hundred feet. The general strike of nearly all the veins is very much the same throughout the Slocan, viz., from 30 to 60 deg. east of north, dipping at angles rarely less than 50 deg. toward east, and more frequently approaching the vertical. Bearings cited in the following refer to astronomical north. The deviation varies in the Slocan from 24 deg. east to the east.

AMERICAN BOY MINE.

There are seven levels on the American Boy property, but only four of these are being worked at the present time. I went through Nos. 3 and 4; also a

low-lying level. The ore is generally well bedded, having strong walls and being generally well bedded. In places it is broken up by thin layers of waste rock but in the main is well bedded and is about 2 ft. All levels are driven along the vein, which dips at an angle of about 40 deg. east of north. In common with the other mines of the same vicinity the principal mineral production has been a high-grade silver-lead ore, containing some blende. Occasionally lenses of rather clean blende are met with. During 1905 a quantity (170 tons) of zinc ore was mined and hand-sorted from the galena and shipped to the Prime Western Smelter Company of Topeka, Kansas. Thomas McGuigan, manager of the mine, stated that the average grade of the zinc ore shipments had



Mountain-side

been from 45 to 47 per cent. zinc, with about 15 oz. in silver to the ton. The first 130 tons was fairly low in lead, and realized \$11 net per ton, while the last 40 tons contained 8 per cent. lead, on which a penalty was levied by the smelter.

In the floor of the low-lying level, 18 in. of blende in the floor and 21 in. above this place in a raise. This was pointed out as one of the best showings in the mine. The sample assayed 39.8 per cent. zinc and 3 oz. silver per ton. The extent of the lens of ore disclosed at this point

could not be determined with any degree of accuracy from the present developments. I was informed by

shipments are brought down to Cody over the Noble Five aerial tramway, which is leased for the purpose



Typical View of Mountain Ranges in Slope District.

the manager that in addition to the ore body referred to there were others showing in the lower levels. All

and is only a short distance off.

While the American Boy has never been a heavy

producer, its output of high-grade silver-lead ore has for several years been a steady one. It is and, within the last year or so that the management has taken up the zinc question, in which considerable interest is displayed.

NOBLE FIVE GROUP.

This group, owned by Hon. James Dunsmuir of Victoria, adjoins the American Boy on the east. On account of litigation the property has not been operated for several years, but at one time it produced a considerable tonnage of high-grade silver-lead ore, which in some cases changed into zinc blende. On one of the claims, called the Deadman, three levels have been driven on a 2 to 3 ft. vein. The strike of the vein is 55 deg. east of north, dipping at an angle of 70 deg. to the southeast and flattening somewhat in a winze sunk from the second level. This level, being the only one of interest from the zinc point of view, was examined. It was first driven 85 ft. along a slip in the slate formation. At this point a cross-cut was made into the hanging wall toward the east for a distance of 20 ft., where the main vein was encountered, and explored in a north-easterly direction a distance of 120 ft. Next the hanging wall and along the floor of this drift a lens of zinc blende averaging 12 in. in thickness has been exposed for nearly the whole distance. About 20 ft. from where the vein was first encountered a winze has been sunk to a depth of 100 ft., proving the existence of the ore body all the way down, but decreasing somewhat in size at depth. About half-way down the vein flattens out to an angle of 55 deg. and here the winze fails to make connection with the lower level, No. 3.

In this winze I took a three-cut sample averaging 12 in. in width. It assayed 55.6 per cent. in zinc and 15.1 oz. in silver and represented the best part of the lens. The vein itself is from 2 to 3 ft. wide, and a little galena is occasionally mixed with the vein matter. The zinc occurs, however, essentially as a clean blende. From present developments no considerable tonnage of ore can be estimated, but I believe that the showings warrant the owner in developing the property and blocking out the ground between Nos. 2 and 3. The first step should be to effect a connection between these levels and then explore further by raising on the vein from below. Present work on the property was done some time ago by lessees who extracted all the galena in sight. They discontinued working as soon as the ore changed into zinc and left the mine in anything but a workmanlike condition. I noticed a few inches galena in one or two of the short drifts running off from the winze in a southerly direction. Such places could conveniently be developed in connection with prospecting for zinc.

The Noble Five properties are opened through the third tunnel of the Last Chance mine. This tunnel is of considerable length, and enters the portion of the Noble Five ground known as the World's Fair claim. A dispute in regard to this ground has existed between the two companies; it is now being worked by them jointly. In this ground there is a stope from

which the Last Chance mine recently shipped two tons of ore containing 40 per cent. zinc. This stope, which is named mostly after the tunnel, is approximately 30 ft. high and 30 ft. long. It appears to carry less ore than the level in blende. Its presence was known long since the tunnel was driven several years ago, but the ore was not removed until zinc became of value as a shipping product. It is possible that similar lenses will be met with in depth in the ground referred to, and there are indications of such at a point further on and nearer to the face of the tunnel, where a winze is being sunk on the vein at an angle of 65 deg. The ore uncovered here appears to be more of a concentrating nature, and is a mixture of galena, blende and slate. The discovery is of such recent date that no trustworthy opinion as to its value can yet be expressed.

Exposures of zinc ore were reported on other claims belonging to the Noble Five group, in which, however, the workings are now unsafe on account of caving in, and consequently these were not examined.

The Noble Five has good accommodations for the men working at the mine; also at Cody a 100-ton concentrator, which is connected with the mine by aerial tramway. The tramway is at the present time under lease to the operators of the American Boy mine. The concentrator, which is now idle, is not arranged for saving zinc ore, and would require remodeling, but it is conveniently situated for handling concentrating ores from various adjacent properties, and the machinery is being kept in good repair.

RECO MINE.

This property, which adjoins the Noble Five on the east, is one of the oldest and best known of the local mines. It consists of five Crown-granted mineral claims and has a total of 150 acres. I was informed that the company at the present time was not attempting to hand-sort any of the zinc ore associated with the high-grade galena. On account of the blende containing high silver value, it is found more profitable to leave it with the galena, even if it be at times necessary to incur a penalty on the excess of zinc. Past experience with zinc ore shipments to Swansea, Wales, was very discouraging. For a 67-ton lot of blende containing 50 per cent. zinc and 99.5 oz. of silver to the ton the Hafod smelter refused to pay anything for the silver content. This was in 1898, but even at the present time the prices offered for high-grade silver-zinc ores in the Sloan are by no means satisfactory.

One of the Reco veins (No. 3), which is narrow but of very high grade, was worked in connection with the adjoining property (the Goodenough), for some time on account of the vein running into the latter. The description of this vein further on will therefore pertain to both properties. The Reco has produced a considerably larger quantity of ore from it than the Goodenough, and is being mined intensively at the present time. There are three veins in the Reco property, which strike parallel to each other. About 25 men find steady employment. The property is one of the constant dividend payers of

the Slocan and so far has distributed approximately \$300,000.

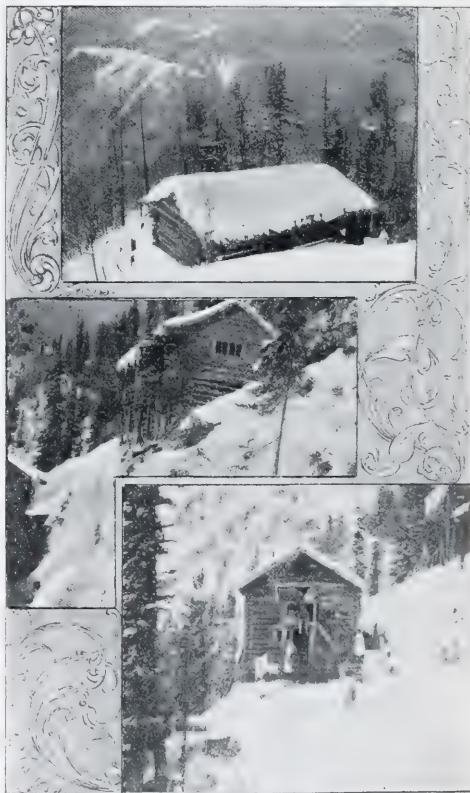
Ore shipments are made over the Reco trail to the railway siding—a distance of four miles—in a unique and cheap manner during the winter season, this being "sliding" or "rawhiding" on the snow. A one-ton parcel of ore, consisting of about one dozen sacks, is wrapped and laced into a raw cow-hide; this is dragged by one horse down the mountain trail, which has a down-grade of about 17 per cent. Besides the raw-hides the same horses, on their return trip, pack provisions and supplies to the mine. Two men are able ordinarily to attend to 12 horses; occasionally a few more. Rough-locking is done with common log-chains. A hide usually lasts one season, but if well taken care of and provided with wooden runners, it will last longer than that. This method of transporting ore is also employed by other mines around Sandon, located similarly to the Reco. In a ruggedly mountainous country, such as this, where the snow-fall attains a depth of several feet each season, a more economical way of handling galena ores in small quantity could not be introduced. Trimming, by means of gravitation, is certainly cheaper, but it involves a considerable investment, which is seldom warranted where the tonnage is small.

GOODENOUGH MINE.

Grey Copper Claim.—This property owned by the Goodenough Mines, Ltd., is situated to the east of the Noble Five group and adjoins the Reco mine to the south. It consists of the Grey Copper claim, which is of full size (600x1,500 ft.) and two fractions, the Goodenough and the Purcell, all Crown-granted, having a total of 50 acres. It has two parallel veins, of which the upper one on the Goodenough is known as the continuation of the Reco vein No. 3, in conjunction with which it was worked from 1894 to 1902. During this period 450 tons of hand-sorted galena was shipped, averaging 45 per cent. lead, 2 per cent. zinc and 300 oz. silver to the ton. The average thickness of this vein is only 8 in. and its greatest thickness 30 in. Four levels, respectively 66, 225, 600 and 775 ft. long, have exposed the vein to a vertical depth of 450 ft., with a total stoping area of 3,300 sq. ft. Since 1902 the property has been shut down, but during the last year the company has resumed development work on its second vein, which is known as the Grey Copper. This vein, while so far not productive of the same high grade of ore as the upper vein, has the advantage of being considerably wider and more regular. It promises to become of importance as a zinc producer.

There are two levels, of which the upper one is 50 and the lower one 120 ft. long. Those levels have been driven on the vein which is from 5 to 6 ft. wide, and crops plainly on the surface. The strike of the vein is north 55 deg. east. The dip is to the southeast at about 70 deg. The vein cuts through a large porphyry dyke at nearly right angles, and has in every respect the appearance of a well-defined and true fissure. The porphyry dyke can be fol-

lowed across the Grey Copper, Texas and Deadman claims and has a width of nearly 1,000 ft. Above the dyke the usual slates and shales make their appearance. They have a bedding-strike of about northwest and southeast, and can be seen on the surface as well as in the workings of the upper Reco-Goodenough vein. It is expected that an additional 50 ft. of tunnelling will take the Grey Copper vein into these slates, and it will be of much interest to observe what influence this change will have on it. The same grade and character of ore is found in both levels, but the pay-streak in the lower one is twice the size of that in the upper one. In the upper level



Mining Camp in Slocan Mountains in Winter.

the pay-streak averages 12 and in the lower level 24 in. in width. Approximately 1,000 tons of ore has been blocked out on three sides between the two levels, which are 85 ft. apart, measured on the dip of the vein. A five-cut sample was taken in the lower tunnel. It represented an average of 24 in. in width and assayed 42.6 per cent. zinc, 18.8 per cent. lead and 33.2 oz. in silver to the ton. As will be seen from the above analysis the ore is of a heavily mineralized character, and requires to be separated more than to

be concentrated. Hand-sorting could not be of little use, unless it were followed by concentration of the "sortings." A lot of 40 tons of the ore, which was extracted while developing the levels, was tested at the Payne concentrator, near Sandon. The following data on the results of the test were kindly furnished me by the managing director of the company, J. A. Whittier:

	Silver.	Lead.	Zinc.
	Oz.	Per Cent.	Per Cent.
Assay of original ore.....	17	4.0	41
Assay of lead product.....	100	91.0	18
Assay of zinc product.....	12	1.5	50.4

Mr. Whittier was unable to furnish me the exact weights of the different products, wherefore the efficiency of the process cannot be calculated.

The zinc product of this mine has been contracted to the Canadian Metal Company, of Frank, Alberta.

A sample of the average ore was secured for testing at Denver, Colo.

By rail, the Grey Copper camp is four miles from the nearest railway shipping point (Reco Sideling). The present cost of transporting ore by means of pack horses is \$3 per ton, but with a larger output the rawhiding system will no doubt be introduced during the winter season, thereby lowering the cost of transportation materially. The mine crew consists of five men, engaged in driving the two levels ahead.

From its upper vein, the Goodenough Mines, Ltd., extracted at one time \$80,000 worth of galena and paid in dividends \$45,000, while the second vein on the Grey Copper claim is still only in a prospecting stage; it is very promising, and is the most interesting prospect in the locality referred to.

AINSWORTH DISTRICT.

UNION MINE.

A prospect in Ainsworth, known as the Union, is located slightly to the northwest of the United and Glengarry properties. The vein on this claim appears to strike north and south, bedded between quartzite and slate, and dipping at an angle of about 45 deg. On the foot-wall there are several inches of crystalline calcite next to the quartzite. A prospecting shaft has been sunk on the vein, which is stated to be 35 ft. deep. This shaft was partly filled with water and could not be examined. The vein at the collar of the shaft shows a width of 5 to 6 ft. A fair amount of zinc blende and galena is mixed through the vein matter, and a quantity of the material excavated from the shaft can be seen on the dump. On each side of the shaft two or three open cuts have been made on the vein, showing it to be continuous for a distance of about 200 ft. I have all appearances it must have been a good many years since the first assessment work on this claim was recorded. The claim is owned by Frederick McLeod of Ainsworth.

BUCKEYE MINE.

This is situated at an elevation of about 2,500 ft.

above Kootenay Lake in the northern mineral belt and like many of the properties in Ainsworth has not been worked for several years. It is approximately two and a half miles from the town. For the first one and one-half miles an excellent wagon road, passing by the Highland mine, is followed. The remainder of the distance is by way of a fair mountain trail.

Development work on the Buckeye consists of two inclined shafts 100 ft. apart, each about 40 ft. deep, and one tunnel 200 ft. long driven in under the shafts. The surface showing of zinc ore is considerable, but the work done does not seem to have been carried sufficiently far to expose the ore at depth. The two shafts are located on a northeast and southwest line, while the trend of the vein appears to be more north and south. The two shafts were sunk in both shafts to permit examination of the bottom. To the south of the first one a distinct mineralization is visible on the surface. The second shaft was started outside of the vein, with a view of intersecting it at a depth of about 70 ft., but it was never sunk to that depth.

The tunnel, which is about 75 ft. below the surface showings, was driven as a crosscut for 70 ft. At that point a body of zinkiferous ore has been intersected and followed for 45 ft. The ore body only shows in the roof and has not been raised upon. Drifting in the tunnel was continued for an additional 150 ft. through country rock, when a second shoot of zinky ore was encountered at the breast, where it can be seen. This exposure appears to correspond with the principal surface showings and seems worthy of attention. In order to learn its extensions the tunnel should be continued. The work was evidently left immediately after ore was broken into, as it was considered of no value by the owners, who at that time were looking for clean silver-lead ore, and not for a matrix of zinc and iron ore with more or less galena mixed through it. A sample of the face (top and bottom), taken on the vein for width of 18 in., assayed 23 per cent. zinc, but carried less than 1 oz. silver to the ton.

The property is owned by W. C. Dalglish of Sloan City.

GALLAGHER MINE.

This is a Crown-granted claim, also situated in the northern mineral belt, one-half mile beyond the Buckeye and approximately 3,000 ft. above Kootenay Lake. The claim lies near Ainsworth, about three miles. It was at one time a producer, and according to the owner, A. D. Wheeler, 300 tons of lead carbonate ore, carrying silver, were shipped from the mine, and the silver was obtained from the concentrates. The silver was obtained immediately from a surface deposit, and a good deal of the same class of material is still scattered around the workings.

Close to these and apparently following the mineral belt, a small claim, known as the Gallagher mine, has been driven 60 ft. toward the west. At the breast of this drift a fair amount of zinc-lead-iron

drift has been run for about the same distance, and the same ore body broken into. A sample was taken here for a width of 2 ft., representing the best portion of the mineralization. This sample assayed 22.7 per cent. zinc, 3.2 per cent. lead and 24.6 oz. silver. On the surface the vein shows a width of 5 ft., but it is difficult from present developments to connect this surface showing with the ore sampled in the lower level. The strike of surface deposit is approximately north and south and it occurs in a limestone country rock.

NELSON DISTRICT.

MOLLY GIBSON MINE.

This property, owned by the LaPlata Mines Co., is located near the divide between Nelson and Slocan mining divisions, immediately at the head water of Kokanee Creek. By wagon road the main camp is 10 miles from the nearest shipping point, which is on Kootenay River, and is known as Molly Gibson Landing. The mine is tributary to Nelson; the landing is approximately 12 miles from that town by water.

The group consists of four full-size mining claims and two fractions, all Crown-granted, representing a total of about 240 acres. The lower or main camp, where the office and principal buildings are, is at an elevation of 4,600 ft., while the No. 5 level of the mine is 2,400 ft. higher, or approximately 7,000 ft. above sea-level. These terminals are connected by an aerial tramway, 8,000 ft. long, over which all shipments are made to and from the mine. Ample accommodations for the men are found at both terminals. The wagon road from the steamer landing to the lower mining camp is well built and of uniform grade.

The mine is located entirely in a massive, crystalline grey granite, known as the "Nelson granite," which contains large crystals of feldspar. This rock is readily traced to the shores of Kootenay Lake. The veins have a general strike of 30 to 40 deg. west of north and dip to the southwest at an angle of about 75 deg. The vertical depth from the outcrops to the lowest point of development is approximately 800 ft. There are five main and three intermediate levels, of which levels No. 4 and No. 5, and two intermediate ones are by far the most important workings and represent a vertical depth of more than 300 ft. My examination therefore covered these in particular.

A total of about 3,500 ft. of tunnelling has been done along the veins, and, in addition thereto, 750 ft. of raises and winzes. Two veins have been developed, viz., the Florence and the Aspen, of which the former is the larger and more important. It averages from 4 to 5 ft. in thickness, while the Aspen is less than one-half of that width. The policy of the management has been to develop the property in preference to making shipments, and the tonnage shipped so far has therefore not been very large. During 1905 the monthly production has been 110 tons. At the present time all the ore is hand-sorted, and averages, according to smelter returns, about 12

per cent. zinc, 8 per cent. lead and 47 oz. silver to the ton. As it comes from the mine, before sorting the average, according to the manager, is about 7 per cent. zinc, 4 per cent. lead, and 20 to 35 oz. silver to the ton. It is classed as a "dry" ore. The cost of hauling the ore by wagons to the landing is \$4 per ton, by contract; tramping the ore from the mine is figured at 75c. per ton, and stoping at \$2. All the ore is shipped to the Hall Mining and Smelting Co., Ltd., at Nelson, by way of steamer from the Landing.

The first 270 ft. of level No. 4 was driven on the Aspen vein as an adit, and exposed a shoot of ore for a distance of 110 ft. from the portal. This lens has been stoped to the surface above the level, but can be seen here and there for about 175 ft. in the floor. At this place it is narrow and does not represent a very large tonnage. The vein itself which is correspondingly narrow was left at a point 220 ft. from the portal. Here a cross-cut at nearly right-angles was started and driven into the foot-wall for a distance of 60 ft. At this point the Florence vein was intersected and followed at a course of north 35 deg. west. There is a strong and well-defined ledge from 5 to 6 ft. wide, with a seam of talc on the foot-wall, but nothing of particular interest until a distance of 380 ft. is reached. At that point an ore shoot was struck and followed for 330 ft. The width of this pay-streak in this shoot, known as the "big stope," averages 24 in. It has been stoped for a distance of more than 100 ft. above the level, and at the present time there is a good showing of 2 ft. 6 in. of ore in the upper stope. The general assay of the ore after hand-sorting is about as stated previously, according to the smelter returns. A long raise connects this level with No. 3 level and represents a vertical distance of 250 ft.

Following the Florence vein beyond the big stope for an additional 100 ft. it appears to be lean. Here a small fault occurs and a heavy flow of water was struck, the water pouring from a tale gouge on the hanging wall. About 25 ft. further on a new ore shoot is met and pay ore begins to make its appearance again. This can readily be followed in the tunnel, and considerable zinc ore can be seen in the roof; also in the present face. This ore-shoot is from 250 to 300 ft. long. Its average width is about 2 ft. 6 in. In places the vein narrows down to 18 in., while in others it widens out to 6 ft. Coming back 30 ft. from the fore-breast a raise has been put up above the level to a height of about 100 ft., and has proved the existence of the ore very well all the way. The intention is to connect this raise (No. 14) with an intermediate level, which is being driven toward the same at a height of 100 ft. above the level. This intermediate was started from raise No. 11, which is 375 ft. from the main face.

The intermediate level follows the same general direction as the main level, and for the first 150 ft. is correspondingly lean, but a change took place when it reached a point directly above the place where ore had reappeared in the main level. From here onward the ore is continuous for 60 ft., or as far as the north face had been driven up to the date

of my visit (Oct. 12, 1905). It is in the south the same shoot, and the vein shows a very strong and distinctly banded structure for a width of 3 ft. dipping slightly to the southwest. A recent sample was taken here (top and bottom) on four parallel strings representing a total width of 30 in. of ore. It assayed 19.6 per cent. zinc, 17.4 per cent. lead, and 74.4 oz. silver to the ton.

The intermediate level will have to be continued for about 120 ft. before connection is effected with raise No. 11. This work is being done as rapidly as possible. At the same time the main level is also being driven ahead.

From the intermediate level to the next level, No. 3, the vertical distance is 150 ft., but as this level has not yet been extended beyond a point corresponding with raise No. 11, any ground here will have to be regarded as unexplored, except as to that portion which is situated immediately above the big "slope," from where it is reasonable to expect a considerable tonnage of both shipping and concentrating ore. The total length of No. 4 adit is 1,100 ft., of which 800 ft. has exposed ore in paying quantity.

Level No. 5, which is the lowest working on the property, was started at a distance of 225 ft. vertically below level No. 4, and driven as a crosscut tunnel for about 120 ft. The object in going so far away from the vein was to bring the portal outside of the danger limit of a snow-slide that scour the mountain each spring, and has left its marks distinctly in a draw following the side hill not far from the entrance. At the end of this crosscut the Aspen vein was struck, and here the ore-shoot, which corresponds with the first one in No. 3 level, was intersected. This shoot, following the general strike of the vein for 200 ft., is not much wider than the one corresponding with it above, and cannot therefore be considered of the same importance as the ore-bodies of larger dimensions further ahead. For a distance of 30 ft. above the level the ore has been stoped. The levels at the end of this shoot have been turned off at nearly right angles for 50 ft., where the Florence vein was encountered. Evidently the prospect here did not come up to expectations, for immediately afterward the level was again turned off, and within a distance of 100 ft. the Aspen vein was struck for the second time. A body of ore was disclosed and was followed for 195 ft. The pay streak is of the average size and grade. A sample was taken along the roof in several places where short stopes have started for a distance of 20 ft. or so above the level. The sample represented a width of 2 ft. 6 in. It assayed 18 per cent. zinc, 6 per cent. lead, and 34 oz. silver to the ton. The general average of the ore body, as stated by the manager, is 7 per cent. zinc, 4 per cent. lead and 20 to 35 oz. silver.

The stopes sampled and described in the foregoing appeared to be quite characteristic of the vein. Their content in zinc is higher and in composition they would be better suited for concentration than any other ore shoot exposed in the mine at the present time.

Following No. 5 level through the last mentioned

ore-shoot, there is a short break or fault, from which onward the Florence vein appears to come in, indicating that the ore vein may mine. About all of the ore is about a fourth of a mile away from the level. This ore body is perhaps one of the most valuable in the mine, although not from a zinc point of view. A very good grade of silver ore, fairly high in lead, but less so in zinc, is being extracted for a width of 2 ft. immediately above the level. From the end of this crosscut to the level of No. 4 level there is about 100 ft. of lean ground, but the fore-breast looked favourable, and I have since my visit to the mine, been advised by one of the owners, Bruce White, that a new shoot of ore was uncovered after driving a short distance ahead. The only up-raise of any consequence in No. 5 level is the one which has been put up into the first ore-shoot on the Aspen vein to a height of 125 ft. An intermediate level has been started 100 ft. above the main level by running two short drifts off in a northerly and southerly direction. A fair quality of ore has been uncovered in doing this work, and it is expected to continue to the floor of No. 4 level, where it shows in places. The management therefore intends to carry the raise up higher and extend the intermediate level toward the north. By that time several other raises will be necessary both for ventilation and handling of ore from the large block of ground between the levels, which are 225 ft. apart.

The property is being developed at the present time by a crew of about 20 men. All the workings of importance are being carried forward, and it will readily be seen from the longitudinal section of the mine that by continuing the lower level a large section of ground will be opened up; also that the proving in depth of such ore bodies as have been exposed ahead of No. 5 (in No. 4) are of great importance to the future of the property. The manager estimates that about 50,000 tons of concentrating ore are now blocked out, beside about 25,000 tons partly blocked out.

The company has now under construction at the lower terminal a concentrator of 75 tons daily capacity. The intention is to do away with the hand-sorting at the mine, which will be specially arranged for at the mill. The mill will be driven by water-power, which is being developed. The company has erected a saw mill and all the lumber required for construction work is being cut from standing timber, of which there is no lack on the property.

The problem of concentrating the Molly Gibson ore and effecting a high saving of the silver is by no means a small task, and will require a very careful study. However, the company experimented freely with the ore before it was decided to erect a concentrator. A small amount of the ore was concentrated ore was obtained for testing at Denver, Colo.

This property is managed by Capt. T. H. Trethe-

BLACK PRINCE MINE.

This is a prospect, located near the wagon road on the right side of the road to the Molly Gibson

landing. The vein, which is from 3 to 5 ft. wide, is in the Nelson granite, but is not very clearly defined. Its strike is north 20 deg. west. Development work consists of an open-cut, exposing the vein for a vertical distance of 10 or 12 ft. In the vein a few stringers of zinc-blende can be seen, but an average sample across the face would not have given any satisfactory results. I selected a few pieces of the blende found in the excavated material on the dump in order to obtain an idea of its purity. The result of this sample was 50.4 per cent. zinc and $\frac{1}{2}$ -oz. silver to the ton.

Apparently on the same vein, but 200 ft. below the wagon road, I noticed that some work had been done on the extension of the Black Prince claim. A sample taken in a similar way gave 16.8 per cent. zinc, 5.5 per cent. lead and 2.7 oz. silver to the ton.

KASLO DISTRICT.

BISMARCK MINE.

This mine is situated on Briggs Creek, which is one of the tributaries emptying into the south fork of the Kaslo River from the east. It is about 12 miles from Kaslo and seven miles from the Kaslo & Slocan railway station at South Fork. With the exception of the last mile or so of mountain trail there is a good wagon road leading to the property, following the fork.

Three adit tunnels have been driven on the vein, which is well-defined, averaging 2 ft. 6 in. in width. The two upper levels, which are respectively at 6,700 and 6,588 ft. elevations, are of interest only in reference to silver-lead ore. The ore from them is principally lead and zinc carbonates, with considerable iron oxide and quartz, thus furnishing a very desirable smelting product. The lead carbonate averages from 6 to 10 per cent. in lead, with 135 oz. silver per ton, while the zinc carbonate ore has run up as high as 15 per cent. in zinc, but is usually considerably lower. The production from the mine has never been large, but the property has paid its way. During 1904, about 110 tons of ore were extracted with a crew of three or four men.

The general strike of the vein is 55 to 65 deg. east of north, and it dips at an angle of 70 deg. toward the north. Level No. 1 is 290 ft. long and No. 2 is 200 ft. long, exclusive of 50 ft. of cross-cutting into the hanging wall on each level. In the upper one there is an ore shoot of lead carbonate 30 ft. long, near the portal, while the second one has two ore shoots, viz., 40 and 20 ft. in a direction leading toward the upper tunnel. By keeping up the present development work there are fair prospects for continuing shipments at the same rate. The two above-mentioned levels are connected by means of a raise.

The lowest level, which is really the only one of interest from a zinc point of view, is 440 ft. long and 238 ft. vertically below No. 2. The vein was not struck until a distance of 135 ft. from the portal

had been reached. A cross-cut of about 20 ft. was made here into the foot-wall. The ledge at this point shows plainly for a width of 36 in. A narrow but well-defined and high-grade streak of blende and galena can be seen in the face of the drift. Apparently this ore is just coming in as a new shoot different in character from anything found in the upper levels of the mine. It is a heavy mixture of sulphides, assaying, taken at its full width of 6 in. in two cuts (top and bottom) 38.4 per cent. zinc, 26.8 per cent. lead and 196.3 oz. silver to the ton. Of this class of ore there is at present practically no tonnage developed in the mine, but work on the discovery is being kept up, and the company is justified in continuing exploration work by drifting as well as raising on it. No connection between this level and the upper one exists.

Beyond the cross-cut the level was continued along a slip in the formation, but the ledge referred to in the foregoing was not exposed again until a distance of 245 ft. from the first place was reached. At this point another cross-cut was made intersecting the vein and showing it from 2 to 3 ft. wide. From here onward the ledge was followed to the present face, for a distance of 60 ft., without any further difficulties. It here shows a similar composition and bunches of galena and blende are met with, although not to the same extent nor as regular in occurrence as in the first place. At the fore-breast I measured the ledge for a width of 24 in., leading off at a course of north 55 deg. east. It is of interest to notice the proximity of a large dyke, which can be seen at the face of a third cross-cut, run into the foot-wall, 35 ft. back of the face. This dyke, I was informed, can be traced plainly on the surface.

BLACK FOX MINE.

This property is owned by the Black Fox Mining Co. It is situated below the Bismark, slightly to the northeast of the latter, and adjoins the Cork mine to the south.

The principal vein of the Cork and Province mines, which has been extensively developed and is the most important in the South Fork district, is generally supposed to traverse the Black Fox claim, and also the Daisy, belonging to the same company. From a brief examination of the workings, which consist of a cross-cut tunnel 150 ft. long, I obtained the impression that while there has been a vein cut in the Black Fox tunnel, 100 ft. from its portal, it is not the principal vein of the Cork, but a parallel one of secondary importance, which can be seen in the Cork at 700 ft. from the portal of the main tunnel. There are several parallel veins in this district, and the identification of a particular one, in the absence of absolute connection, is chiefly a matter of surmise and is always doubtful.

In the vein exposed in the Black Fox tunnel only a few inches of zinc blende can be seen. The vein is about 4 ft. wide and crosses the tunnel. A sample consisting of a few selected pieces of blende taken from here gave the following assay: 36.6 per cent. zinc, 2.3 oz. silver. The quantity of ore exposed is so small that the sample cannot be regarded as of

much importance. The surface showing on the property, (approximately 100 ft. further up the hill), is on the other hand quite strong and can be followed for over 200 ft., disclosing a width of several feet. The vein dips at an angle of about 50 deg. to the southeast. Several pits have been dug, exposing the vein and the same character of ore as in the Cork and Province mines, that is to say, a mixture of blende, galena and spathic iron.

In order to intersect this surface vein the tunnel would, in my opinion, have to be driven for some distance further, as the vein is dipping away from the cross-cut into the hill.

B. & A. MINE.

This property is situated approximately three miles south of the Bismark, at an elevation of about 5,000 ft. It is reached from the Kaslo & Slocan railway station by the excellent South Fork wagon road for the first $8\frac{1}{2}$ miles; thence by following the mountain trail for an additional mile and a half along the tributary to the South Fork, known as Lake Creek.

When this property was operated, several years ago, it was entirely for silver-lead ore. The lower tunnel being the only one of interest to the Zinc Commission, was alone examined. The vein has a strike of north 45 deg. east, and a dip of 85 deg. to the southwest. It is of considerable width and appears to be a crushed zone in which lenses of both zinc blende and galena are found. The first 35 ft. of the tunnel, which has a total length of 158 ft., was driven through "wash" until the true hanging-wall was found in place. At this point the tunnel was turned off slightly to the east, and within 18 ft. the true foot-wall was encountered and followed to the present face, representing a distance of 110 ft. The foot-wall, which is perpendicular, is remarkably well-defined as far as it has been developed. The hanging-wall, which can only be seen in places, appears to be equally well-defined. It has a slight dip to the southwest. The vein matter is soft and considerably crushed. It contains much slate and calcite. Two short cross-cuts have been made across the vein. The first one, which cuts through to the hanging-wall at a point 98 ft. from portal, shows the vein to be 16 ft. wide. From 3 to 4 in. of zinc blende can be seen here close to the wall. In the next cross-cut, 55 ft. further ahead, the vein is 20 ft. wide, and apparently the same streak of blende continues through, and can be seen 6 ft. from the hanging wall. The pay shoot here has widened out to 15 in. and a sample which was taken in two cuts (top and bottom) gave the following result: 45 per cent. zinc and 14.2 oz. silver to the ton.

I think there is little doubt that the ore showing in the two cross-cuts is the same shoot of ore. At the present time there is not sufficient ore developed to warrant any estimate of tonnage. So far as can be seen, the exposure of zinc in the second cross-cut is of more importance than in the first. By driving further ahead, and by keeping closer to the hanging-wall than has so far been done, the present showing

of ore might possibly improve in width and importance. The vein is well defined and wide; the vein matter is soft and readily mined. Timber and water are plentiful in the immediate vicinity.

SILVERTON DISTRICT.

EMILY EDITH MINE.

The Emily Edith mine is situated 800 to 1,100 ft. above Slocan Lake, and is three or four miles north of Silverton. It is reached over a good wagon road. The country rock in the immediate vicinity consists of shales and slates, and the Emily Edith lode impressed me as being a considerably crushed and widely-mineralized ore zone in that formation. It shows much irregularity in its width, course and dip. Its general strike is about north 65 deg. east. It ranges in width from a few feet up to 30 ft. Its dip in the upper levels is about 45 deg., while in the lower ones it is from 60 to 75 deg. to the southwest. There are altogether on the property six adit tunnels, from which many drifts and cross-cuts extend in the direction of one or other of the walls. The total footage of work is probably at least 8,000 lin. ft. I visited four of the tunnels and located the principal zinc ore shoot of the mine in each of them. These represent a vertical depth of 173 ft., or about 250 ft. measured on the dip of the vein. The ore-body is no doubt continuous for this distance, and of importance as a concentrating ore. Recently a mill test was made on a 100-ton lot at the Wakefield concentrator, and a representative sample of the zinc concentrate, produced from the ore, was secured for experimental purposes.

In the upper tunnel No. 02, the ore body referred to above shows for a distance of 60 ft., averaging about 2 ft. in width. In the next tunnel No. 01, which is 57 ft. below No. 02, the ore can be seen to better advantage and measures in one place 6 ft. in width. A sample was taken here across the face in a short upraise, and in three other cuts, representing an average width of $\frac{1}{2}$ ft. for 30 ft. along the level; it assayed 34.2 per cent. zinc, 7.7 per cent. lead and 7.2 oz. silver to the ton. This was apparently the best grade of ore showing in the mine. Beyond the 30 ft. sampled the same character of ore can be seen and followed for 100 ft. or more. The ore body for this distance would hardly average over 2 ft. in width. The vein itself is of considerable width, and the pay ore appears to lie on both walls, which are from 10 to 20 ft. apart. The foot-wall is well developed, the hanging-wall being more or less crushed and broken, and the ore is well exposed on both sides as well as on the hanging-wall. Moreover, many intersecting veins have been traced for some distance in all of the tunnels.

In tunnel No. 1, which is 53 ft. vertically lower than No. 01, the ore body is again well exposed, and is of considerable width. In the next tunnel, No. 04, and a sample was taken from the ore, the pay ore in these cuts (top and bottom) was taken for an average width of $\frac{1}{2}$ ft. This assayed 39.2 per cent. zinc, 10.4 per cent.

lead and 13.2 oz. silver to the ton. The ore shoot has been exposed intermittently along the supposed foot-wall for 250 ft.; also in a drift back of the supposed foot-wall for about 75 ft. The pay-ore in both drifts is from 2 to 3 ft. wide, and fairly continuous. At one place along the level, about 150 ft. from where the last-mentioned sample was taken, the ore body widens out to 6 ft. 6 in. A raise has been put up here, proving its extension for a certain distance. Complete examination could not be made here with safety. The blende is of fine grain, and lies on the foot-wall. A sample was taken here for a width of 6 ft. 6 in. in three cuts, 10 ft. apart. It assayed 26.2 per cent zinc, 8.7 per cent. lead and 10.4 oz. silver to the ton.

While there is no tonnage of ore actually blocked out in this property there is undoubtedly a considerable quantity of concentrating ore to be relied on. I should estimate this roughly at 10,000 tons of ore, carrying 22 per cent. zinc, 6 per cent. lead and 6 oz. silver to the ton. Systematic development work is likely to increase this tonnage materially.

In tunnels No. 3 and 4 there has been considerable drifting and cross-cutting done, but so far it has not proved successful in locating the above-mentioned ore body or any others. Tunnel No. 3 is entirely off the course and must have been driven for other purposes than the one of showing up existing ore bodies. All work on the property, including cross-cutting and drifting is distributed in the levels about as follows:



Characteristic View of Country and Mines in Silverton District.

The next level, No. 2, is 63 ft. vertically below No. 1, and exposes the ore shoot for about 75 ft. along the level; also in a drift 10 ft. above the level, where a sample was taken in three cuts covering a distance of 25 ft., representing a width of 3 ft. It assayed 24.6 per cent. zinc, 10 per cent. lead, and 10.3 oz. silver to the ton. In a cross-cut about 40 ft. from where this sample was taken the ore-body shows a distinct width of 10 ft. This showing has, however, not been followed up, because the original company was not developing the property for zinc. The galena associated with the ore could evidently not be mined and sorted at a profit and would require concentration. Conditions at the present time are somewhat different, and the property has been for the last year or so under lease to M. S. Davys of Nelson, who is planning to work it for its combined zinc and silver-lead values.

No. of Level.	Elevation above sea-level. Feet.	Approx. Amount of Development Work. Feet.
02	2870	700 to 800
01	2822	1200 to 1300
1	2760	1500 to 1600
2	2706	1800 to 1900
3	Not observed.	400 to 500
4	2501	1500 to 1600

The elevation of Slocan Lake above sea-level is 1,761 ft.

The Emily Edith property is equipped with an aerial tramway for handling shipping ore; also a number of good buildings, such as office, bunk-houses, stables, ore sheds, etc., all of which are located below the main workings and go to make up a complete and well-arranged camp. So far the shipments from the property have not been extensive. The group consists of six Crown-granted claims and comprises 150

acres. It is owned by the Emily Edith Mines, Ltd., of London, England.

GALENA FARM MINE.

This property, formerly known as the Currie group, comprises several Crown-granted claims in the Silverton district, which are owned by an English company. It contains 193 acres of mineral land, situated about 1,000 ft. above Slocan Lake, $1\frac{3}{4}$ miles southeast of Silverton, with which it is connected by a good wagon road. The vein has a strike of about south 60 deg. east and a dip of 50 deg. north. It is in granite formation and outcrops strongly on the surface for several hundred feet. It can be seen in places with a width of 9 to 10 ft. It shows quartz, spathic iron, galena and blende mixed with fragments of granite and slate.

All workings except two or three surface pits are at the present time under water, which prevented examination at depth. A sample was taken 15 ft. under ground in the original prospect shaft. This assayed 38.4 per cent. zinc, 13.4 per cent. lead and 32 oz. silver to the ton. Another sample taken in two or three places on the surface croppings assayed 42 per cent. zinc, 6.8 per cent. lead and 14.6 oz. silver. These results should not be considered an average of the ore, but will convey an idea of its composition.

About 175 ft. west of the shaft mentioned above, a perpendicular two-compartment working shaft has been here sunk to a depth of 220 ft., and levels 100 ft. apart have been run off from here for the purpose of intersecting the vein. Considerable work has been done under ground. I had no means of ascertaining the result of this work.

The machinery plant is well arranged and has, during the long shut down, been taken good care of. It consists of a first-class geared hoist driven by a 4-ft. Pelton water wheel, one standard cage and hoisting equipment, and one 4-drill air compressor driven by a 6-ft. Pelton water wheel. Beside the above machinery there is a steam hoist and boiler plant, which was used before water power was installed, still in position; also several pumps apparently in good order. The water-power is obtained from Gold Creek, where a dam has been constructed. A 3,500-ft. pipe-line conveys 100 miners' inches of water to the water-wheels under a head sufficient to furnish a pressure of 110 lb.

In its notes on the mining market the London *Mining Journal* said, on May 18, "the most marked improvement in the American section is in Le Roi No. 2, which have further put on 3-16 at 25-16 £2 6s. 3d.). The manager cables that he is confident he has discovered the H vein on the 900-ft. level. So far the values are not as good as they were at the 700-ft. level, where, at the last report, they averaged 2.75 oz. gold. On the 900-ft. level the latest assay is only 0.58 oz. gold, but the discovery is said to look promising."

WHITEWATER CAMP, SLOCAN DISTRICT.

Two Well-known Mines in Ainsworth Division.

WHITEWATER and WHITEWATER DEEP are adjoining mines, situated in the western part of Ainsworth mining division, yet usually regarded as Slocan district mines. Nearly eleven years ago the Whitewater mine was visited by Mr. Wm. A. Carlyle, then provincial mineralogist, who in his Bulletin No. 3, "Report on the Slocan, Nelson and Ainsworth Mining Districts," (see "Annual Report of the Minister of Mines for 1896") said of it: "This property has paid for itself since its discovery, high-grade silver ore having been mined from the grass roots without ever a demand for money being made upon the owners; and this year a dividend will be paid of \$25,000." (The total of dividends paid to 1903 has been stated as \$209,500.) After describing the property as he saw it Mr. Carlyle concluded his comments with the following information relative to its ore: "Six lots of ore sent from this vein were the first sent out of the Slocan via Kaslo, and in the early days it cost \$100 per ton before any returns were received. Much of the ore shipped is of the 'carbonate' class, with the silver value ranging from 72 to 298.5 oz. per ton, the lead from 11 to 30 per cent., while the galena ore yielding 35 to 65 per cent. lead, assays in silver from 75 to 362.6 oz. per ton, or an average of the whole output of the mine for 1896 of 114 oz. silver per ton and 30 per cent. lead. This ore carries from 16 to 17 per cent. zinc, and the smelter charges vary from \$9 to \$13 per ton—\$9 if the lead is below 20 per cent.; the cost of the freight being \$1 per ton to the railway, and \$11 to the smelter."

The Whitewater and Whitewater Deep are now being jointly operated under lease by a small syndicate, at the head of which are Messrs. S. S. Fowler of Nelson, and J. F. Retallack of Kaslo. It is understood that the lessees are doing well though not working on a large scale. Last year's production was 800 to 900 tons of ore and concentrates shipped to the smelter. The following report, by Mr. Philip Argall, of Denver, Colorado, made in his capacity of a member of the Zinc Commission appointed by the Dominion Government to report on the Zinc Resources of British Columbia, has been taken from the "Report of the Commission," pp. 174-177:

WHITEWATER MINE.

This property, owned by the Whitewater Mines, Ltd., is situated within 11½ miles of the Whitewater Station on the Kaslo & Slocan Railway, over an excellent wagon road. The ore is delivered from the mine f.o.b. cars, for 75 cents per ton.

There is but one vein opened. It was discovered in 1892, and worked vigorously for silver-lead for several years, but for the last three years intermit-

tently under lease. The first shipment of zinc ore was made in 1904, though the vein contains large quantities of zinc, as is well shown by the analysis of the lead concentrates. The zinc blende is for the most part rich in silver.

The Whitewater mine is developed by seven tunnels. The vein varies in width from 8 ft. down and may be said to average 5 ft., the pay streak about 8 in. The mine has produced 12,548 tons of lead concentrates and 8,435 tons of hand-sorted lead ore, which averaged 84.4 oz. silver per ton, 33.9 per cent. lead, and 18.5 per cent. zinc. The average price received for this ore, covering a period of 10 years was approximately \$37 per ton.

The first zinc shipment of 38 tons assayed as follows:

Silver	33.4 oz.
Zinc	46.0 per cent.
Lead	4.5 per cent.
Iron	7.2 per cent.
Silica	8.0 per cent.

Net price received, \$16.92 per ton.

The second lot amounted to 61 tons, assaying

Silver	17.6 oz.
Zinc	43.2 per cent.
Lead	3.7 per cent.
Iron	8.0 per cent.
Silica	9.0 per cent.

Net price received, \$8.37 per ton.

Mill.—A concentration mill was erected in 1898, having a capacity of 8 tons per hour and costing approximately \$45,000. It is of the usual roll and jig variety, operated by water-power and designed to produce a lead concentrate only. The operating cost when worked up to its capacity in 1900 was 36.33 cents per ton, the following year 33.4 cents, and in 1902, 31.59 cents per ton of ore milled. A sample of mixed zinc ore was taken from the bed of a third compartment jig, to show the composition of the zinc ore; it assayed: silver 28.4 oz., lead 6.7 per cent., and zinc 27.8 per cent.

Mine.—The vein with an east and west strike and southerly dip of 35 deg., has been followed from its outcrop above No. 1 tunnel to No. 7 tunnel and quite extensively stoped for a vertical depth of 500 ft. The mine, at the time of my visit, was being operated by three sets of lessees; one was working around the pillars and in the old stopes, and the other two advancing No. 6 and No. 7 tunnels westward in the continuation of the ore shoot and with fairly good results.

The map of the workings shows a regular and rather a long ore shoot for the Slocan. The No. 2 tunnel, for example, is stoped for a distance of 400 ft., while No. 6 tunnel has been stoped for a length of 450 ft. on the same ore shoot, and all the intervening ground between these levels is also stoped within the lines of the main ore shoot, which appears to average 450 ft. in length. These old stopes are said to be crushed, caved and inaccessible between

the first and sixth levels. The stope map indicates a second, or eastern, shoot extending from No. 4 to No. 7 level, showing by the stoping a length of 250 ft. on No. 6 and 100 ft. on No. 7 level. Towards the end of No. 7 tunnel, which by the way is situated at an elevation of 4,150 ft. above sea level, the drift follows the foot-wall too closely, and the lessees have recently cross-cut into the hanging, proving the vein, according to Mr. A. C. Garde, to be 8 ft. wide carrying 3 ft. of zinc and lead ore from which he took a sample, which assayed: silver 57.4 oz., lead 26.2 per cent., zinc 29.6 per cent.

From the best information obtainable it would appear that a considerable quantity of zinc ore has been left in the old stopes, in the form of broken ore and pillars, much of which may be recovered by the lessees. While in a moderate depth below the seventh level, the Whitewater vein will pass into the Whitewater Deep property, yet there is much ground to the west of the Whitewater Deep covering the strike of the vein, on which no attempt has been made to open up the main vein, though the prospect of finding pay ore in that neighbourhood is promising.

WHITWATER DEEP MINE.

The Whitewater Deep, as the name would indicate, covers the Whitewater vein on its dip after passing outside the lines of the Whitewater Mines, Ltd.

The Whitewater Deep Co. has an extensive establishment in the town of Whitewater, consisting of a palatial residence for the manager, sumptuous offices and well arranged assay office, together with a large and well-furnished hotel, now in the hands of a caretaker, as are also the other buildings of the company at this place.

Mine.—The mining operations of this company consist of a main tunnel with some cross-cuts and three raises on the vein, from which a slight amount of drifting has been conducted. The main tunnel starts at an elevation of 3,779 ft., and is advanced 1,500 ft. westerly from its portal. For the greater part of the distance the tunnel has advanced in faulted ground, broken and crushed slate, with only one small ore lens showing on the tunnel horizon. In the face of the tunnel the vein consists of 18 to 24 in. of siderite dipping south at 40 deg. A little quartz is showing in the foot-wall, but no zinc or lead is visible. A short cross-cut at the tunnel face exposes what is probably the hanging wall, but the vein should be cross-cut thoroughly at this point, and the true hanging-wall determined. On the east side of this cross-cut about 1 in. of mixed galena and fine-grained blende occurs on top of the siderite. The vein in the face while barren is well defined and looks to me a good prospect, more particularly as by extending the drift it would pass under the points where ore is now being mined in Nos. 6 and 7 tunnels of the Whitewater mines, which is undoubtedly on the same vein. I examined two of the raises over the main Whitewater Deep tunnel; the western one

showing a lens of siderite standing almost vertical in the vein, and containing a little galena. Passing the next raise to the east, I went up the second one and in a branch drift saw a fair vein of siderite with a little blende and lead, averaging 15 in. wide in the aggregate. Near the head of the raise a drift extended west about 50 ft. and carried a fair vein, averaging 18 in. wide of siderite, with occasionally a seam of mixed lead and zinc ore from 2 to 6 in. in width. This also looks a good prospect, but the company having expended the bulk of its capital in the acquisition of the property, and the erection of buildings, the actual development of the property has been apparently lost sight of.

There is abundant evidence of crushing and folding, resulting in slight faulting along the greater

probably near the vein, and on account of the lagging and rotten condition of the ground and timbers I could not determine the fact. A drift was here extended into the foot-wall, following the dyke for some distance, then passing through it and entering the ground of the Whitewater mine, but no ore was encountered in this drift.

A lower tunnel, at elevation of 3,375 ft., say 400 ft. below the main tunnel, was also commenced in the early days of this property, but no serious attempt was made to push it ahead. The distance to be covered in order to intersect the vein is very great, and doubtless the showing made on the main tunnel discouraged the running of another tunnel at so much greater depth. An air compressor operated by a Pulliam engine was erected near the lower tunnel.



CONNECTIONS: MINE: Whitewater Mine, principal workings.

part of the distance in the main tunnel. It is well illustrated in one of the cross-cuts, where an intrusive dyke has been crushed and folded along with the enclosing slates. The vein occurs, at least in some parts of its strike, practically in the cleavage of the slate and shows evidence of faulting to some extent, and I rather suspect that slight movement is still taking place. An important feature of this vein is the strong lens of siderite that occurs near the face of the main tunnel and continues for some distance easterly. The point to determine is: Does this siderite form the bottom of the pay ore? In other words: Do the zinc and lead minerals, which occurred so extensively in the workings of the Whitewater mine immediately above, give way in depth to barren siderite?

About 600 ft. from the portal of the main tunnel a dyke of basic rock was encountered, which in all

and the air pipes were brought up to the main tunnel, although the ground there was so soft that machine drills could not be used to advantage.

No connection has been made between the main tunnel of the Whitewater Deep mine and the workings of the Whitewater mine immediately above. Three raises were put up on the vein and some drifting conducted from them, as previously described, but none of these has communicated with the workings above. It is obvious that the two properties could best be operated as one mine; then the raises could be connected with the old workings of the Whitewater, establishing good ventilation, and I believe they would open up good stoping ground. In this direction, and in the advancement of the main tunnel further westerly, lie the principal hope of future production from the Whitewater property.

COAL MINES OF INTERIOR AGAIN IN OPERATION.

Agreement Between Coal Mine Operators and Miners.

CROW'S NEST PASS COLLIERIES and other coal mines that were also compelled to close down, owing to their employees having declined to continue at work pending a settlement of wage and other matters in dispute, are again in operation, a mutually satisfactory settlement having been arrived at between the employers and their men. In the March number of the *MINING RECORD* (pp. 115-118) were published particulars of the differences between the two parties. As the lengthy conference held at Calgary, Alberta, did not result in an agreement, the men stopped work and application was made to the Dominion Government for the appointment of a board of conciliation under the recently-passed act making provision for such a situation as had arisen. The board was duly constituted and its members gathered at Fernie in readiness to take such action as should be found necessary. Representatives of mine owners and mine workers, respectively, however, resumed negotiations for a settlement and finally came to an agreement.

TEXT OF AGREEMENT.

The full text of the agreement, which is dated May 4, 1907, follows:

It is hereby agreed between the Western Coal Operators' Association (consisting of the Pacific Coal Co., Ltd.; the H. W. McNeill Co., Ltd.; the Breckenridge-Lund Coal Co., Ltd.; the West Canadian Collieries, Ltd.; the Canadian-American Coal and Coke Co., Ltd.; the International Coal and Coke Co., Ltd.; and the Crow's Nest Pass Coal Co., Ltd.) of the one part, and the employees of the said companies, as represented by the United Mine Workers of America, District No. 18, of the other part: That the agreements existing prior to April 1, 1907, respecting general provisions and scales of contract prices and wages shall govern the parties hereto for the period of two years commencing April 1, 1907, and ending March 31, 1909, in so far as the same may not be modified nor affected by the provisions of this agreement, it being understood and agreed that the parties thereto will meet in conference 60 days prior to the expiration of this agreement to discuss a renewal thereof.

This agreement covers all the mines, coke ovens, and outside plants operated by the companies and all persons accepting employment at these mines agree to be governed by the following rules and regulations:

Settlement of Local and General Disputes.

(a) In case any disputes or grievances arise under this agreement or any local agreement made in connection therewith, whether the dispute or grievance is claimed to have arisen by the company or any person or persons employed or by the men as a whole, then the parties shall endeavour to settle the matter

as hereinafter provided. But before any grievances or disputes shall be submitted to the pit committee, the person or persons affected shall endeavour by personal application to the pit boss to settle the matter and in the event of their agreeing their decision shall be final.

(b) In case of any local dispute arising in any mine and failure to agree between the pit boss and any employee the pit committee and mine superintendent shall endeavour to settle the matter and if they agree their decision shall be final.

(c) In the event of the failure of the pit committee and the mine superintendent to settle any dispute so referred to them, as well as in the event of any other dispute arising, the matter in dispute shall be referred to the general superintendent or general manager of the company and the officers of District No. 18, U. M. W. of A., for settlement, and if they agree their decision shall be final. Should they fail to agree it shall be referred to a joint committee, said committee to be made up of three operators appointed by the Western Coal Operators' Association and three miners, appointed by District No. 18, of the U. M. W. of A., for settlement. If they agree their decision shall be binding upon both parties. A majority of the full committee must vote in favour of any action before it can be declared carried. In the event of a failure to agree the committee shall endeavour to select an independent chairman and failing to agree upon an independent chairman the Minister of Labour shall be asked to appoint such chairman. The decision of the committee thus constituted shall be binding upon both parties. The joint committee when necessary shall meet on the second Monday of each month.

(d) In the meantime and in all cases while disputes are being investigated and settled, the miners, mine labourers and all other parties involved must continue to work pending investigation and until final decision has been reached, but where miner or miners, mine labourer or mine labourers, has or have been discharged by the company, he or they shall not remain in the employ of the company while his or their case is being investigated and settled. If a claim be made within five days where a man or men has or have been unjustly discharged, the case shall be dealt with according to this article and if it is proven that he or they have been unjustly dealt with, he or they shall be reinstated. If claim is made for compensation for time lost in cases where reinstatement has followed it shall be left to the joint committee to decide what amount, if any, is to be paid.

(e) Any breach of the agreement by any of the parties thereto is not to void the said agreement but same is to continue in full force and effect. It is not intended, however, by this sub-section to abridge the right of the men to suspend work after final settlement as herein provided if any operator or operators refuse to be bound by any decision given against him or them under this article.

New Work.—Whenever any new work arises, a price for which has not been provided for in this agreement, on the request of the company or the

miners, the joint committee of the Western Coal Operators Association and District No. 18 of the C. M. W. of A. shall meet within 30 days after the said request and arrange a price. Meantime and until such price has been arranged all men shall be paid upon the day wage scale.

Hours of Work.—It is understood that nothing herein shall be held to afford any grounds against the enactment of legislation respecting hours of labour in the province of Alberta.

Contract Mining Rates.—There shall be added a 5 per cent. increase on contract mining rates at the following mines: No. 9 Coal Creek, No. 3 Michel, Lundbreck and Canmore. See Schedule A.

Outside Labour.—There shall be added an increase of 25 cents per day to all \$2 rates, and an increase of 5 per cent. to all rates of \$2.50 and over. See Schedule B.

Inside Labour.—There shall be added an increase of 25 cents a day to drivers, tail rope riders and hoistmen. See Schedule C. At Bankhead, Canmore, Lundbreck and Lille there shall be added an increase of 5 per cent. to all other transportation men, and those connected with the handling of coal, this increase being given on account of the longer hours of work at those mines. See Schedule D.

Schedule A—Mining Rates.—Coal Creek No. 9 mine, 52½ cents per gross ton.

Michel, No. 3 mine, 57¼ cents per gross ton.

Lundbreck mine, main and counter gangways, 63 cents per cubic yard; angle work, 57¼ cents.

Canmore mine No. 1, seam breasts, \$5.77½ per lineal yard; pillars, \$6.30; skips, \$2.62½; No. 2 mine, seam breasts, \$1.05 per lineal yard for each foot in thickness; pillars, \$1.31¼; skips, \$2.52½; No. 3 mine, seam breasts, \$5.77½; pillars, \$6.30; skips, \$2.62½; No. 4 mine, seam breasts, \$6.30; pillars, \$6.30; skips, \$3.15.

Schedule B—Day Rates and Hours.—Bottom men, per day, \$2.62½, 10 hours.

Slate picker boys, \$1.25, 10 hours.

Slate picker men, \$2.25, 10 hours.

Car oiler men, \$2.25, 10 hours.

Car oiler boys, \$1.50, 10 hours.

Tally boys, \$1.25, 10 hours.

Teamsters, \$2.62½, 10 hours.

Blacksmiths, \$3.67½, 10 hours.

Blacksmith's helpers, \$2.62½, 10 hours.

Carpenters, \$3.67½, 10 hours.

Carpenters' helpers, \$2.62½, 10 hours.

Power house engineers, \$3.67½, 12 hours.

Power house engineers, \$3.15, 8 hours.

Fan men, \$2.62½, 12 hours.

Hoisting engineers, \$2.89, 8 hours.

Tailrope engineers, \$3.36, 8 hours.

Tailrope engineers, \$3.67½, 10 hours.

Box car loader engineers, \$3.15, 10 hours.

Tipple engineers, \$3.15, 10 hours.

Locomotive engineers, outside, \$3.15, 10 hours.

Locomotive engineer's helper or switchman, \$2.75, 10 hours.

Firemen, \$2.67½, 8 hours.

Firemen, \$3.67½, 12 hours.

Railway car lamplighter men, \$2.36, 10 hours.

Tipple lamplighter men, \$2.36, 10 hours.

Tipple dumper boys, \$1.50, 10 hours.

Car repairers, \$3.15, 10 hours.

Breaker engineer, \$3.15, 10 hours.

Fan fireman, \$3.15, 12 hours.

Lampman, depending upon number of lamps and skill of man, \$2.25 to \$3.15, 12 hours.

Lampman, \$2.25 to \$2.62½, 8 hours.

Machinist, \$3.15 to \$3.67½, 10 hours.

Machinist's helper, \$2.62½, 10 hours.

Ashman, \$2.25, 10 hours.

Ashman, \$2.62½, 12 hours.

Wiper man, \$2.62½, 12 hours.

Coupler man, \$2.25, 10 hours.

Coupler boys, \$1.50, 10 hours.

Breaker oiler, \$2.62½, 11 hours.

Washer or tipple oiler, \$2.62½, 11 hours.

Breaker picker boss, \$2.62½, 10 hours.

Timber framer men, \$3.15, 10 hours.

Box car shoveller men, \$2.62½, 10 hours.

Breaker platform boss, \$2.62½, 10 hours.

Breaker platform men, \$2.36½, 10 hours.

Breaker screen men, \$2.25, 10 hours.

Rock bank men, \$2.25, 10 hours.

Dirt bank men, \$2.25, 10 hours.

Finisher after box car loader, \$2.25, 10 hours.

All other outside labour, \$2.25, 10 hours.

Schedule C.—Drivers, \$2.75, 8 hours.

Drivers in wet places, \$3, 8 hours.

Hoistmen, \$2.75 to \$3, 8 hours.

Rope riders, \$2.75, 8 hours.

Main and tail rope riders, \$3, 8 hours.

Schedule D.—Coupler men, \$2.62½, 8 hours.

Coupler boys, \$1.57½, 8 hours.

Pushers, \$2.62½, 8 hours.

Loaders, \$2.62½, 8 hours.

Buckers, \$2.62½, 8 hours.

Locomotive engineers or motormen, \$2.89, 8 hours.

Locomotive switchers or motormen helpers, \$2.62½, 8 hours.

Cagers, \$2.62½, 8 hours.

Cager in shaft, \$3, 8 hours.

The schedule rates under this agreement are to be the minimum rates paid, but nothing in this agreement shall be construed to prevent the companies from paying higher rates should they so desire. It is also understood that where higher rates have prevailed no reduction shall take place.

Beehive Coke Ovens.—Levelling and drawing 61-ton charge, \$1.

Levelling and drawing 50-ton charge, \$1.80.

Loading into box cars, over 200 tons per month, .17.

Loading into box cars, less than 200 tons per month, .16.

Steam locomotive engineers, \$3.15.

Motormen, \$2.89.

Larrymen, \$2.25.

Plasterers, \$2.25.

Carters and cleaners, \$2.25.

All other labourers, 10 hours, \$2.25.

All charges to be large or small, at the discretion of the coke-oven superintendent.

Belgian Coke Ovens.—Ram enginemens, \$3.15.

Chargers, \$2.62½.

Chayers, \$2.62½.

Drawers, \$2.62½.

Loaders, \$2.36.

Briquette Plant.—Engineers, \$3.67½, 10 hours.

Briquetter, \$3.78, 12 hours.

Briquetter's helpers, \$3.15, 12 hours.

Tar melter, \$2.62½, 12 hours.

Labourer, \$2.62½, 12 hours.

(Signed)—The Western Coal Operators' Association, G. G. S. Lindsey, president; Lewis Stockett, vice-president; W. F. Little, secretary. The Pacific Coal Co., Ltd., L. Stockett, general manager. The H. W. McNeil Coal Co., Ltd., H. W. McNeil, general manager. The Breckenridge-Lund Coal Co., Ltd., J. Breckenridge, president. The West Canadian Collieries, Ltd., O. E. S. Whiteside, general manager. The Canadian-American Coal and Coke Co., Ltd., S. M. Moore, general manager. The International Coal and Coke Co., Ltd., H. N. Galer, vice-president. The Crow's Nest Pass Coal Co., Ltd., G. S. Lindsey, general manager. The United Mine Workers of America, District No. 18, F. H. Sherman, president; John Galvin, vice-president; A. McDonald, secretary; P. Patterson, international board member.

LAPLATA MINES, KOKANEE, NELSON MINING DIVISION.

Continued Development Resulting in Enlarged Output.

LAPLATA MINES is the new name of the old Molly Gibson property, situated at the head of Kokanee Creek and distant about ten miles from the west arm of Kootenay Lake. A description of the property as it was toward the close of 1905 is printed on pp. 190-191 of this issue of the *MINING RECORD*. Since that time there has, however, been much additional development work done and a concentrating mill erected. It is not intended to at this time give full particulars of developments and new equipment, but rather to briefly outline the progress made, give some information concerning the value of the mine product, and indicate the further permanent improvements requisite to place the mines in a position to produce ore and make shipments under conditions less costly and disadvantageous than is practicable at the present time.

In the mine the extension of several levels, the discovery of new shoots of ore, and the working of productive stopes comprise much of the progress made in 1906-7. The completion and decidedly successful operation of the concentrating mill facilitated production by providing for the treatment on the property of much ore of a lower grade than is usually shipped to the smelter. While the concentrator was designed to treat about 75 tons of ore in

24 hours, in actual practice it has been found equal to 60 tons in 12 hours. The mill was constructed by Chas. Culver, an expert mill man well known throughout the Slokan. It is equipped with rock crushers, rolls, picking belt, five stamps for fine crushing, trommels, Hartz jigs (two, three, four, and five-compartment), Overstrom tables, Frue vanners, etc. The mill is water-driven, the machinery being belt-connected with a Pelton wheel. The installation of a duplex air compressor is in hand.

As to values—the following table will show what the smelter returns were from five separate shipments made a few months since:

Lb. of Ore.	Value of contents.
63,891	\$1,755.28
41,221	805.57
46,495	1,194.82
26,634	322.68
96,505	1,883.75
274,746	\$5,962.10

This gave an average value for 137 tons of rather better than \$43 per ton. This of course was shipping ore of higher grade than that now sent to the mill.

On April 15 last, the mine manager's report showed a production of 45 tons per day, all of which was being concentrated. Earlier in the month he reported as follows: "I would not care to state the quantity of ore in sight in the mine because it is very difficult to estimate, but I will say that notwithstanding the amount of ore that has been extracted since we started the concentrator in May, 1906, we now have more ore in sight than we had at that time because development has been steadily proceeded with. There is certainly a very large tonnage of ore available in the mine. In my opinion the most valuable portions of the ore bodies have not yet been reached and the ore already in sight is sufficient to run the plant for ten years. We have had many difficulties to overcome since installing the concentrator, but this has done better work than was claimed it would do and it is in excellent condition at the present time. The buckets and running gear of the aerial tramway have been practically rebuilt. The question of less costly transportation of ore to Molly Gibson landing, on Kootenay Lake, remains to be solved. A light aerial tramway would cost not less than \$5,000 per mile, while the cost of a teaming outfit would be between \$6,000 and \$8,000 with repair of road before the latter could be put in passable condition for heavy traffic. This would be in addition to the Government aid towards repairing the wagon road, and perhaps under present conditions would be the better course. The foundation for compressor plant is about ready and the compressor will be placed in position at once, but owing to there being 7 to 8 ft. of snow there will be some delay, for we shall have to wait until the ground is nearly free from it before the pipe line can be completed and the plant put into commission."

COPPER PLACERS IN WESTERN YUKON AND ALASKA.

NATIVE COPPER in the form of alluvial or placer deposits has for some time past been known to occur at the head of White River, which takes its rise in some high mountains in southeastern Alaska and flows through the eastern part of the Canadian Yukon until it reaches the Yukon River. In August of last year the *MINING RECORD* published a paragraph stating that the source of the fine specimens of native copper obtained at the head of White River and exhibited in Dawson in 1905 had been reported to have been discovered by M. C. Harris and partners, and that Harris, who was believed to be truthful, had stated "they found the vein some 700 ft. up the side of a steep mountain and that at a depth of 10 ft. there was a width of 30 ft. of copper ore between well-defined walls; further, that in the centre of the ledge where opened there was a streak of native copper from which a slab estimated to weigh about two tons had been taken out." The following month this journal reprinted from the "Summary Report of the Geological Survey Department of Canada for 1905" Mr. R. G. McConnell's report on "Head Waters of White River." Concerning copper in this locality Mr. McConnell said:

"Native copper is almost as widely distributed in the creeks of the district as gold. It is found on Bullion, Sheep and other creeks flowing from the St. Elias Range, and also on Burwash, Tatamagouche and Arch Creeks, in the region between Klunac River and the Donjek. It is not found on Ruby, Fourth-of-July, nor any of the streams cutting the old schists of the Ruby Range.

"The principal copper creek in the White River district is Kletsan Creek. This stream is situated in Alaska, about four miles west of the International Boundary. It was examined by Mr. A. H. Brooks of the U. S. Geological Survey, in 1898. Brooks found that the stream copper, in part at least, was derived from calcite veins cutting a dioritic rock exposed along the valley. These copper-bearing rocks do not extend far in an easterly direction, as they are soon buried beneath a great accumulation of young volcanic rocks."

Seemingly the discovery of Harris and partners, which was followed by a stampede of between 100 and 150 men from the head of Tanana River, Copper River down to Valdez, in Alaska, and Klunac, in the Whitehorse district of Yukon, has not been lost sight of, for quite lately the *Engineering and Mining Journal* of New York published the following under the heading "Copper Placers":

There is prospect of a new development in mining, which is of great interest both technically and commercially. This is the exploitation of alluvial deposits of native copper. In Alaska, at the head of White River, and at the head of Copper River, above Fairbanks, there are gravel deposits containing native copper in large nuggets, the latter comprising some

huge masses. The amount of copper available in the form appears to be large, but the extent of the deposits has not yet been accurately determined. On Copper River these placers run up into the copper deposits in place. On White River, the sources of the placer copper appear to be traced to the glacial ice, and the erosion seems to be still going on from the flow of the glaciers.

It is expected that steps to secure these copper placers will be taken in the near future. The working season will be rather short, but the means for working, either by dredging or by ordinary hydraulic mining, can be quickly installed, and upon the completion of the railway, which is planned to open the Copper River country, a considerable supply of copper may be quickly looked for from this source. The technical interest in the subject pertains to the fact that, so far as we are aware, these are the only copper placers of the world, and their exploitation will extend to copper a class of mining which heretofore has been practically confined to gold and tin stone.

MINERAL OUTPUT OF THE PROVINCE OF QUEBEC.

QUEBEC'S MINES do not as yet contribute largely to the total of the annual mineral production of Canada, as will be seen from the statistics given below. These were contributed to the *London Mining Journal* by its Ottawa correspondent who, under date February 25, 1907, wrote:

The report of Mr. J. Obalski, director of the Bureau of Mines, Quebec, for the year 1905, is but just to hand. The Province produced no silver or gold in 1905, and its output of iron ore shows only the small figure of \$140,000. Asbestos was the principal mineral produced; of that substance 48,960 tons, and of asbestic 19,220 tons were raised, the aggregate value of which is placed at \$1,507,550. Copper ore, mica, and phosphate are the other considerable items. The following is the mineral list:

Iron ore, tons	140,000	\$	140,000
Chromic iron ore, tons....	8,528		104,565
Copper ore, tons.....	48,960		128,850
Asbestos, tons	19,220		1,476,450
Asbestic, tons	189		31,100
Mica, tons	1,471		1,471
Phosphate			1,471
Calcined ochre			22,675
			<hr/>
			\$1,897,653

Add to this the total of metallic products, the \$1,845,000 worth of mineral mentioned above, and an aggregate of \$3,742,653 is reached, which seems no great sum when the undoubted wealth of the Province in minerals is borne in mind. Almost nothing is now heard of gold mining operations which a few years ago caused much activity in the Beauce district, in the south-east of the Province. Apatite or phosphate of lime, which promised well not long ago,

shows the small output of 1,475 tons. And iron ore deposits, considering the growing enquiry for them, have not revealed themselves as marketable to the degree which might have been expected. The two furnaces at Drummondville and Radnor use generally the local bog ore and charcoal for smelting purposes. These produce a superior iron, but only in moderate quantity, the output for the year being 6,774 tons, of a value of \$166,267.

SUMMARY OF THE MINERAL OUTPUT OF ONTARIO IN 1906.

ONTARIO'S MINERAL OUTPUT, for the year 1906, according to the report prepared by the officials of the Department of Mines, represented a total value of \$22,221,808, as compared with \$17,854,296 in 1905. This is estimated on the value of the minerals in the form in which they leave Canada, not at average market prices, less certain deductions, as in British Columbia. The net value of the metallic output was \$13,179,162 and of the non-metallic \$9,042,646. The most noticeable gains during the year in the metallic group were those of silver, which was \$2,170,212; nickel, \$481,485; copper, \$309,555; pig iron, \$644,720. In the non-metallic the increases in values produced in 1906 over 1905 were: Portland cement, \$595,563, and natural gas, \$216,970. The output of crude petroleum was worth \$136,999 less than in 1905. The output of the mines at Cobalt for the year was: Silver, 5,357,830 oz., worth \$3,543,089; cobalt, 312 tons, worth \$30,819; nickel, 156 tons and arsenic, \$1,558. Up to the close of 1906 Cobalt camp had produced 8,016,061 oz. of silver, valued at \$5,015,479; 446 tons of cobalt, 245 tons of nickel, and 1,919 tons of arsenic. For the three last-named constituents mine-owners receive little or no return, but they are estimated to be worth \$150,779, \$13,467 and \$3,596, respectively.

Following is the table of metallic products. Its gross value is \$13,422,928, from which \$243,766, the value of 101,569 tons of Ontario iron smelted into pig iron, is subtracted, making the net value \$13,179,162:

Gold, oz.	3,519	\$	59,274
Silver, oz.	5,357,830		3,543,089
Cobalt, tons	312		30,819
Nickel, tons	10,932		3,836,419
Copper, tons	5,940		998,548
Lead			93,500
Iron ore, tons	128,099		301,032
Pig iron, tons	275,558		4,554,247
Zinc ore, tons	400		6,000
			<hr/>
			\$13,422,928

The output of the non-metallic group was:

Arsenic, tons	1,298		
Brick, common, No.	300,000,000	\$2,157,000	
Tile, drain, No.	17,700,000	252,500	

Brick, pressed, No.	39,860,000	337,795	
Brick, paving, No.	3,000,000	45,000	
Building and crushed stone		660,000	
Calcium carbide, tons.	2,626	162,780	
Cement, portland, bbl.	1,598,815	2,381,014	
Cement, natural rock, bbl.	8,453	6,000	
Corundum, tons	2,914	262,448	
Feldspar, tons	20,373	43,849	
Graphite, tons	1,772	15,000	
Gypsum, tons	3,265	6,605	
Iron pyrites, tons.	11,095	40,583	
Lime, bush.	2,885,000	496,785	
Mica, tons	355	69,041	
Natural gas		533,446	
Peat fuel, tons	300	900	
Petroleum, Imperial gal-lons	19,928,322	761,546	
Pottery		65,000	
Quartz, tons	3,856	3,586	
Salt, tons	50,414	367,738	
Sewer pipe		365,000	
Sodalite, cu. ft.	200	6,000	
Talc, tons	1,235	3,030	
			<hr/>
			\$9,042,646

PLACER GOLD MINING IN BRITISH COLUMBIA BY THE GUGGENHEIMS.

NUMBERS OF MEN are being taken into the Cariboo district to work at hydraulicking on placer gold properties acquired from the Consolidated Cariboo Hydraulic Mining Company last year by Guggenheim interests which afterwards incorporated the Cariboo Gold Mining Company. Others are being employed in excavation and construction work on an enlarged water supply system for these properties. Special stages convey the men from Ashcroft, on the Canadian Pacific main line of railway, to Bullion, the company's headquarters in British Columbia, the distance being about 190 miles. The old company obtained water for gravel-washing from Morehead, Bootjack, and Polley's lake reservoirs, but the ditch that connected with the mine having been cut away for nearly a mile and three-quarters, it will not be practicable to commence washing this season until after the lower section of the new ditch, from the Spanish Lake system, shall be completed, which will be some time in July. The snowfall on the water-shed supplying this mine was greater last winter than for several previous winters, so a proportionately large recovery of gold the ensuing washing season is looked for. The mine is equipped with a gravity tram, hydraulic elevator, and Loveridge derrick, and much preparatory work has been done in readiness for the removal of the gold-bearing gravel. A profitable season is, consequently, expected with confidence.

In connection with the new water supply system,

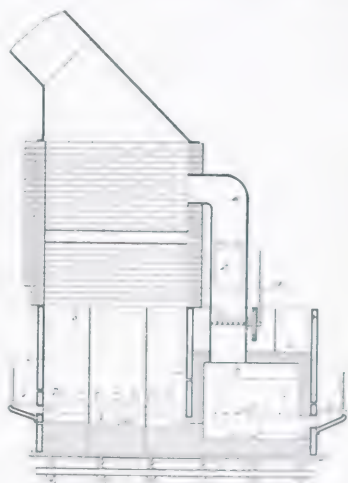
known as the Spanish Lake system, which is designed to overcome the chief difficulty under which the old company operated, viz., an insufficient supply of water, much preliminary work throughout and some excavation and construction on the Billion section, were done before the coming in of the winter necessitated a suspension of operations until spring. Steam shovels are on the ground, so excavation work will be greatly facilitated by use of these machines. It is intended to, if possible, complete the system before next winter. The total expenditure on the Spanish Lake system last season was nearly \$100,000; to complete it a further expenditure of \$450,000 to \$500,000 will be required. The much enlarged supply of water it will provide should admit of a larger recovery of gold during future seasons than in any past year.

WATSON'S IMPROVED SMELTING FURNACE.

WILLIAM J. WATSON of Ladysmith, Vancouver Island, manager of the Tyee Copper Company's smelter, has been granted United States Patent No. 836,548, under date November 20, 1906, for his invention of an improved smelting furnace. The following illustrated description has been taken from *Mines and Minerals*, a widely-read mining journal published at Scranton, Pennsylvania, U.S.A.:

This invention consists of an improved smelting furnace designed for the production of a high-grade matte or a blister copper direct from sulphide ores without the necessity for preliminary roasting or subsequent resmelting. Fig. 1 is a vertical longitudinal section through both divisions of the furnace. In the drawing, 2 represents the matting division of the furnace, the walls of which are water-jacketed, bronze sections being introduced where apertures are required, as at 3, for the water-jacketed slag spout 4 and at the passage 5 to the secondary or refining division 6. The customary blast tuyeres 7 are introduced in the jacketed side walls 8, and the bottom 9 is downwardly sloped from the slag outlet 3 to the passage 5 in the opposite side, which passage may be arched and lined with firebrick. The secondary or refining division 6 is merely a continuation of the matting furnace 2, separated therefrom by the water-jacketed partition 10; but as the combustion conducted therein is derived merely from the oxidizable constituents of the matte, this refining division is lined throughout with basic firebrick to reduce radiation, and the arched roof 11 is kept down as low as possible to hold the heat in close proximity to the charge of matte within. The bottom 12 is below the level of that of the furnace 2, either dropped, as shown, or the slope of the bottom of the furnace 2 is continued uniformly to the farther end of 6. The side walls of 6 are penetrated with high-pressure blast tuyeres 13, downwardly directed inward, so that the inner ends of them are just beneath the level of the matte, so as to effectually act upon it for purposes

of oxidation. Opposite to the passage 5 is a water-jacketed spout 15, the level of which is as much below the slag spout 4 of the matting division 2 of the furnace as the balance level of the more dense matte and slag in the division 2. In the roof 11 of the division 6 is a flue 16 for the escape of the furnace gases, and through this flue silica or silicious ore to form the desired flux is charged through a door 17 in the level of the charging floor 18. The ore charged through this door is deposited upon a tilting grate 19, on which it is allowed to rest until required. The ore thus becomes heated and all moisture expelled by the passage of the furnace gases through it before it is dropped into the furnace. In



W. J. Watson's Improved Smelting Furnace.

the operation of this furnace the ore under the low-pressure blast will be matted or without the use of fuel in the furnace 2, and the matte will flow through the passage 5 into the division 6, where, under the action of the high-pressure blast the sulphur, iron, etc., will be oxidized and will be respectively vaporized or slagged off by the silicious flux added through the door 17, combustion being maintained by the oxidation of the sulphur and iron and the combination of the iron oxide with the silicious flux. The matting slag will flow off through the slag spout 4, while the refined matte and the slag made in refining will overflow at the spout 15. Tapping holes 20 and 21 may be furnished in the divisions 2 and 6 for drawing off the contents of the furnace when required. The furnace may be used for the production of blister copper by a suitable increase in the use of the high-blast tuyeres 13 to insure more complete oxidation of the impurities in the matte, in which case the copper will be drawn off through the tapping hole 21 and the slag made in refining will be allowed to flow out at the spout 15.

COMPANY MEETINGS AND REPORTS

TEL-KWA MINES, LTD.

By an oversight the following was omitted from the MINING RECORD last month: The annual meeting of the Tel-Kwa Mines, Ltd., was held at Nelson on March 18, with H. E. Macdonell, president, in the chair. The directors submitted a brief report, showing the financial statement to date, and a list of the shareholders. T. F. Sutherland, formerly of Greenwood, who has been engaged as superintendent for the coming season, was present, and at the suggestion of the chairman reviewed the situation at the property in the north, when he left there last fall. J. J. Campbell explained that it was intended to Crown grant the company's eight claims and smelter site this year and all the properties would be surveyed. In addition more surface exploratory work would be done in order to get a better idea of the value of the company's holdings. The directors elected for the ensuing year were H. E. Macdonell, J. J. Campbell, R. S. Lennie, J. E. McNaughton and Col. Topping. Subsequently the board re-elected H. E. Macdonell president and J. J. Campbell, vice-president and secretary-treasurer. G. Player was appointed auditor.

ALASKA-MEXICAN MINING CO.

This company owns a large low-grade gold property on Douglas Island, Alaska. It also works under lease the 700-ft. claim owned by the Alaska United Mining Co. The property is equipped with a mill of 120 stamps. The report is for the year 1906. The capital stock authorized is \$1,000,000; issued, \$900,000, in shares of \$5 par value.

The statement of earnings and expenses for 1906 is as follows, with the averages per ton milled:

	Amount	Per ton
Free gold	\$302,773	\$1.6512
Sulphurets	382,606	1.3819
Interest	2,759	0.0116
Total receipts	\$724,228	\$3.0447
Mining expenses	\$332,645	\$1.3985
Milling expenses	62,200	0.2615
Sulphuret treatment expenses.....	25,705	0.1081
Bullion charges	3,229	0.0136
General expenses	12,117	0.0542
Construction	6,424	0.0269
Total expenses	\$443,100	\$1.8628
Net earnings	\$261,127	\$1.1819

From these net earnings dividends amounting to \$216,000, or 24 per cent., were paid, and \$50,000 charged off for depreciation, leaving a balance of \$15,128. Adding \$111,995 brought forward from previous year, made a total undivided surplus of \$127,123.

The mill statement shows that the average value of the tailings was \$0.1882, which would bring the value of the ore up to \$3.2223 per ton. Of the bullion saved 51.8 per cent. was in free gold from the mill, and 48.2 per cent. in sulphurets saved by concentration and afterward smelted. The quicksilver fed in the mill was 0.2519 oz. per ton crushed; the loss of quicksilver for the year was 18,422 oz., or 30.7 per cent. of the total fed. The distribution of the clean-up in the mill was: Barrel, 6.2 per cent.; vanner, 2.1; tanks and tail-boxes, 11.6; blocks, 2; tables, 75.3; traps, 2.8 per cent. The average duty per stamp per 24 hours was 5.69 tons. The total milled was 237,862 tons.

The running time of the full mill for the year was 348 days, 4 hours, 21 minutes, during which time steam was used for power 223 days, 47 minutes, and water for power 125 days, 3 hours, 34 minutes. During the year, 1 lb. of chrome steel in the shoes crushed 2.42 tons of ore, and 1 lb. of iron in the dies (which are made at the

Treadwell foundry) crushed 4.80 tons of ore, at a total cost of \$0.0298 per lb. for the iron and steel consumed in crushing one ton of ore.

The mine statement shows 328,627 tons broken, of which 10,860 tons were rejected as waste; 237,862 tons were sent to mill, the balance remaining in stock. Development work included 182 ft. shaft-sinking; 1760 ft. raises; 441 ft. stations and skip-chutes; 4,857 ft. drifts and cross-cuts. The ore reserves in sight December 31 were 856,390 tons, of which 240,129 tons were broken in stopes, and 619,261 tons blocked out. All these reserves were below the 440-ft. level.

There was an average of 17.66 machine drills in use. The average work done per drill shift was 36.04 ft. of holes, and 26.28 tons broken; an average of 0.73 ton broken per foot drilled.

A new double-drum, 48x20-in. hoist has been installed at the main shaft. Following out the general plan of substituting crude oil for coal as fuel for the mines on Douglas Island, all the piping for pumping the oil to the storage tank and supplying the boilers has been completely installed and the foundation for the oil tank finished. The feed pumps and the steel oil tank are on the ground.

CROW'S NEST PASS COAL CO., LTD.

On February 8 the tenth annual general meeting of shareholders in the Crow's Nest Pass Coal Co., Ltd., was held at the head offices of the company in Toronto, Ontario, but owing to the necessary attendance of the general manager at the mines, was adjourned until April 30. On the latter date the adjourned meeting was held, and at this 80 per cent. of the stock was represented, either in person or by proxy.

The vice-president, Hon. Robert Jaffray, having taken the chair, the secretary, after reading the notice calling the meeting, read the tenth annual report of the directors and the accompanying financial statement:

DIRECTORS' REPORT.

"The directors beg to submit to the shareholders of the company their tenth annual report, including statement of assets and liabilities, as of 31st December, 1906.

"The balance at the credit of Profit and Loss Account brought forward from 1905 amounts to \$351,801.07. To this has been added the sum of \$351,791.35, being the company's net profits from the operations for the year, so that the aggregate of the Profit and Loss Account is \$703,592.42. From this amount, the directors have paid four quarterly dividends of 2½ per cent. each, making 10 per cent. for the year, and amounting in all to \$350,000, and have carried forward to 1907 \$353,592.42 to the credit of Profit and Loss Account.

"The coal mined this year amounts to 806,901 tons as against 831,249 tons mined in 1905. The production of coke amounted to 213,295 tons as against 257,702 tons in 1905. The difference in production is due to the strike which commenced on September 22, and lasted practically two months. Had the strike not occurred, and the average been maintained, the output would have reached the 1,000,000-ton mark for the year.

"During the year there has been spent on improvements the sum of \$137,292.69 by the Coal Company, \$11,880.28 by the Electric Light and Power Company, and \$20,996.58 by the Morrissey, Fernie and Michel Railway Company, or a total on improvements of \$170,169.55.

"The contract existing between the company and its employees expired on April 1, 1907. Seven of the operators in the Crow's Nest Pass and on the main line of the Canadian Pacific railway in Alberta met their men at their request in joint conference in the month of March, with a view to renewing their agreements. After more than twenty days of patient labour in the consideration of the subject, it was found impossible to reach an agreement, the question of the closed shop being the point

pany and the Morrissey, Fernie & Michel Railway Company have made necessary improvements, and require a considerable amount of expenditure on capital account.

"The new office building at Fernie was completed in May, 1906, and immediately occupied. It is a spacious and commodious building, admirably suited to the requirements of the different departments.

"In looking over our balance sheet for the year, I find that the statement of our assets and liabilities has changed very little, and I would again recall to your minds that these assets are made up almost entirely of the cash investment in plant and development.

"The reorganization of the company, to which reference was made at the last annual meeting, was not proceeded with on account of the disturbed labour conditions and their results, it not being thought wise to reorganize in a year in which finances were affected to the extent to which they were in this way.

"There have been no changes in the office staff during the year, and I take pleasure in testifying to the capability and zeal of the various officers.

"I have every reason to believe, notwithstanding the increased competition in coal and coke operations, that the company's business will expand rapidly and satisfactorily. At the present time all are bending their energies towards the production of a larger tonnage. While the strike of last year unsettled conditions for a time, and retarded development somewhat, your directors have every reason to believe that the growth of the West is such as to justify a very considerable increase in development work, and a greater output of both coal and coke.

THE VICE-PRESIDENT'S ADDRESS.

Lieut.-Col. Sir Henry M. Pellatt, vice-president of the company, in seconding the motion to adopt the report, said:

"The subsidiary companies continue to expand their operations and become more useful to the parent company.

"The Morrissey, Fernie & Michel Railway Company has built a large amount of new yard trackage at Fernie, and will this year have to purchase two new locomotives.

"The Electric Light and Power Company has added considerably to its water works system at Fernie; has extended its telephone lines and improved its power plant. There has also been considerable extension of the electric light lines during the year. It has also acquired a water power with considerable potentialities at Elko, and the board has under consideration the question of using this for the generation of electrical energy.

"The sale of lots in the Fernie Annex continues. Miners are for the most part the purchasers, and are to a very considerable extent building their own houses.

"Of the improvements made by the Coal Company, the ever increasing demand for house accommodation by the men has to be taken care of.

"A second box car loader has been installed at Coal Creek and a third is being put in at Michel. It has been found necessary to add new steam and electric locomotives to the outside haulage plant and materially increase the steam power at the collieries.

"At Coal Creek three new seams of coal have been opened up. No. 6 seam, near the present tipple, is in 5 ft. of good coal, and will add considerably to the company's producing powers. Another seam, at the rock cut, about three miles from Fernie, has developed into a good 6-ft. producing seam. A seam of cannel coal at an altitude of 2,000 ft. above the level of the Coal Creek valley, is being prospected, and promises to be a good producer of this very valuable coal.

"The underground improvements have also been considerable. Development work at the older mines, both at Michel and Coal Creek, is being pushed ahead, so as to increase the company's producing capacity, and an increased tonnage is assured. All the railways are doing a large business, and the price of metals is and has been for some time unprecedentedly high, so that the smelters

are running at full capacity and there is every reason to believe that orders will steadily increase."

The report was unanimously adopted.

On motion duly made the following by-laws were confirmed:

By-law No. 107, being a by-law to give the land commissioner power with the secretary to execute deeds in favor of purchasers of land from the company.

By-law No. 109, being a by-law to amend By-law No. 98, to abolish the office of third vice-president and re-establish the office of managing director.

By-law No. 110, being a by-law to amend By-law No. 17, as to the business to be transacted at a directors' meeting held immediately after an annual meeting.

On motion it was resolved that the thanks of the shareholders are due, and are hereby tendered to the general manager, general superintendent, comptroller, land commissioner and other officers of the company for their services to the company in the fulfilment of their respective duties during the past year. This was responded to, in the absence of the general manager, by the comptroller, Mr. Davies.

On motion it was resolved that the number of directors for the ensuing year be 15.

The ballot was then taken, and the scrutineers reported the following gentlemen elected as directors for the year 1907: Hon. Geo. A. Cox, Hon. Robert Jaffray, Lt.-Col. Sir Henry M. Pellatt, K.B., Lt.-Col. J. D. Chipman, Thomas Walmsley, C. C. Dalton, James W. Woods, W. J. Morrice, E. C. Whitney, E. R. Wood, Lt.-Col. James Mason, G. G. S. Lindsey, K.C., Elias Rogers, Frank H. McGuigan, Francis McLennan, K.C.

At a subsequent meeting of the directors the following officers were elected: President, Senator Geo. A. Cox; Vice-Presidents, Senator Robert Jaffray, Lt.-Col. Sir Henry M. Pellatt, K.B.; Managing Director, G. G. S. Lindsey, K.C.; Treasurer, E. R. Wood; Secretary, G. G. S. Lindsey, K.C.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi.—April: Shipments amount to 9,685 tons, containing 1,958 oz. gold, 4,200 oz. silver and 206,900 lb. copper. Estimated profit on this ore after deducting cost of mining, smelting, realization and depreciation, \$5,000. Expenditure on development work during the month, \$16,500. Ore shipments to Trail smelter now finished. In future all shipments will be sent to the smelting works at Northport.

Le Roi No. 2.—April: Josie mine report: Shipped 1,740 tons. Net receipts are \$31,179, being payment for 1,820 tons shipped, and \$1,412, for 60 tons concentrates shipped—in all, \$32,591. Vancouver mine report: Shipped 40 tons. Net receipts are \$1,421, being payment for 20 tons shipped. Concentrates, no receipts. Net estimated value lead concentrates made during April, \$10,000.

Le Roi No. 2.—Cable has been received from the company's manager at Rossland:—"In order to give earliest possible information, although no final decision yet arrived at, am confident have discovered the H vein 900-ft. level. We have commenced to drive to the vein; looks most promising; today assays, gold, 0.58 oz., copper, 0.50 per cent.; width indeterminate; will not be less than 1 ft. 6 in. H vein, 700-ft. level—Average since last advice—gold, 2.75 oz., copper 0.50 per cent." (Office note—The last advice referred to was a cable received on May 6 from the manager, stating that he had reason to believe that the streak of ore on which driving had been commenced on the 700-ft. level was the downward continuation of H and that for four days the average assay had been 1.30 oz. gold and 0.70 per cent. copper.)

Slough Creek.—The manager cables: "Pressure is still decreasing, and now represents a fall of about 200 in. in the height of the water." The secretary writes:—"The

new machinery is working well, and owing to the larger quantity of water now being pumped 147 p. m. has already gone down 6 lb. per sq. in. This represents a reduction of about 14 ft. in the column of water, affording a strong presumption that the new plant recommended by Mr. Kendall should be ample for all requirements.

Tyce.—April: Smelter ran 13 days and smelted: Tyce ore, 880 tons; custom ore, 2,121 tons; total, 3,001 tons. Matte produced from same, 269 tons. Gross value of contents (copper, silver and gold), after deducting costs of refining and purchase of custom ore, \$7,658.

U. S. A.

Alaska Treadwell.—*Alaska Mexican.*—*Alaska United.*—April 12: Mines have been closed since April 1, on account of labour troubles, but think an early settlement may be expected.

Alaska Treadwell.—April 17: 240-stamp mill running day and night. Part crew at all mines. (Alaska Mexican, Alaska Treadwell and Alaska United).

Exploration Company.—April 27: Alaska Treadwell—Alaska Mexican—Alaska United Companies. Upon the suggestion of my (our) superintendent the dividend(s) will be deferred. Labour now is quiet, and working, but situation not completely settled.

Alaska Mexican.—April: 120-stamp mill ran 14½ days, crushed 8,047 tons; estimated realizable value of bullion, \$21,399. Saved 145 tons sulphurets; estimated realizable value, \$8,990. Working expenses, \$26,377.

Alaska Treadwell.—April: 240-stamp mill ran 19 days, crushed 18,760 tons; estimated realizable value of bullion, \$26,995. Saved 450 tons sulphurets; estimated realizable value, \$25,088. Working expenses, \$56,018.

Alaska United.—April: Ready Bullion claim: 120-stamp mill ran 15 days, crushed 10,700 tons; estimated realizable value of bullion, \$11,717. Saved 165 tons sulphurets; estimated realizable value, \$6,435. Working expenses, \$20,812.

NOTES.

The Pay Roll Gold Mining and Milling Co., Ltd., with authorized capital of \$500,000, was incorporated on November 17, 1899. Its registered office is at Cranbrook, East Kootenay. In the "Annual Report" for 1898 the provincial mineralogist gave a short description of the Pay Roll group, on Little Nigger Creek, in the course of which he observed "as nothing more than a surface exposure has been made and the permanence of the vein has not been established, it is an open question whether the lead can be profitably worked." The company is now in liquidation.

The London, England, *Critic* says: "A cablegram from Juneau, Alaska, states that the Alaska Consolidated will probably begin milling about the beginning of June. The company has 100 stamps erected, and its ore reserves are estimated at 10,000,000 tons. Like all Alaskan properties, the ore is very low-grade, but it can be handled so economically that it can be treated at a profit. The results secured by this company should be closely watched by investors."

At a meeting of the Crow's Nest Pass Coal Company held on May 22, it was resolved to issue \$500,000 additional stock. The new stock will be issued to those present shareholders who desire to take it at the ratio of one of the new bonds for each seven shares of the original stock which each shareholder now has. The price of issue will be \$250 per share. The proceeds of the new stock are to be used for development purposes.

At a meeting of the directors of the Giant-California Mining Company, held at Rossland on May 17, officers were elected as follows: President, Jay P. Graves; vice-president, A. L. White; secretary, Charles H. Wolf; treasurer, George W. Wooster. William Yolen Williams, who developed the Granby was chosen superintendent. The company decided to at once begin operation on the Giant and California claims. It was stated during the meeting that there was ample funds at the command of the company to carry on development work and place the mine on a profit-making basis.

The Pacific Coal Mining Co., Ltd., has been incorporated in Ontario with a capital stock of \$6,000,000, and headquarters in Toronto. The company is a general mining, smelting and shipping concern. The names of the directors are: J. S. Lovell, accountant; E. W. McNeill, solicitor's clerk, and others of Toronto, but the enterprise is understood to be one of Mackenzie & Mann.

The Trusts and Guarantee Company, Ltd., liquidators of the William Hamilton Manufacturing Company, of Peterborough, Ontario, have accepted an offer made by R. R. Hall, M. P., to purchase the assets of the Hamilton Company. The price offered was \$192,000. At a meeting of the creditors it was decided to ratify the acceptance of the offer by the liquidators.

An announcement in the *Yukon World* intimates that at Dawson another dredging company is applying for incorporation. It is entitled the Indian River Gold Mining and Development Company. The incorporators are Harold G. Blankman, George G. Lemons, Russell Hildebrand, E. Smith Strait and R. B. Ackerman, all of Dawson. The capital stock of the company is to be \$1,000,000, in 1,000,000 shares of \$1 each.

COAL MINING NOTES.

The Crow's Nest Pass Coal Company's mines are again producing a large quantity of coal—nearly as much as before the recent strike that caused a suspension of operations for several weeks. A local newspaper lately stated that about 1,000 men were at work at the company's Coal Creek mines and 650 at its Michel mines.

At the end of May fire broke out in one of the slopes of the Wellington Colliery Company's No. 4 mine in Comox district, Vancouver Island. As this is one of the most productive of the Comox mines, the interruption thus caused to production of coal is particularly unfortunate at this time when the demand for coal is greater than the supply. It is hoped that during June it will be found practicable to resume work and production here.

According to a press despatch from Brandon, Manitoba, local coal companies have decided to amalgamate and build a monster coal shed. It will be built this summer and be large enough to hold sufficient coal to last for years. A large quantity of coal will be put in stock during the ensuing autumn in preparation for meeting next winter's heavy demands.

The Hillcrest coal mine, near Frank, southwest Alberta, is still idle and the managing director states that work will not be resumed under the general agreement recently made between the Mine Operators' Association and the miners, the terms being regarded as unfair in some respects to the Hillcrest mine. The installation of the new plant for handling coal, will, however, it is understood, be completed.

A coal company, capitalized at \$1,000,000 has been organized in Edmonton and a charter applied for. American capital is interested, three Minneapolis men being the shareholders. The company will operate a mine up the Saskatchewan River, some 50 miles from Edmonton and 78 miles due west from the Canadian Pacific railway at Leduc.

CONSTRUCTION NOTES

The Pacific Coal Company, which also owns the Bankhead colliery, Alberta, is putting in a 250-h. p. Rand duplex engine, for operating a large ventilating fan, at the coal mine it is opening at Hosmer, Crow's Nest Pass.

At Phoenix, Boundary district, the Granby Con. M. S. and P. Co. is now operating the hoisting engine the installation of which at its new Victoria shaft was lately completed. It is a Rand 250-h. p. double conical drum engine, driven by a Westinghouse 3-phase variable speed induction motor; its capacity is 1,000 ft. of 14-in. steel rope.

The Dominion Copper Company, Ltd., has bought for

its Sunset mine, near Greenwood, Boundary district, a Rand 10-drill compound air compressor. This engine will shortly be installed. A 50-h. p. electric hoist has also been purchased for this mine.

Large quantities of materials are being taken into the Yukon by the Guggenheim mining companies, for use in connection with their water supply system for hydraulicking and dredge-mining operations in the Dawson district. About 1,000,000 ft. of timber for dredge construction purposes has been purchased in British Columbia and one-fourth of this quantity is now in transit between Skagway and the head of navigation on the Yukon River. About 100 large pipes, approximately 70 ft. in length by 4 ft. diameter, have been shipped from the Fraser River terminus of one of the transcontinental railways for Skagway, en route to the Yukon. These pipes were manufactured in Pennsylvania and are probably the largest ever taken into the Yukon.

The Dominion Copper Company, Ltd., now supplies compressed air from a central power house on its Idaho mine, Phoenix, Boundary district, to four of its mines, viz., the Idaho, Brooklyn and Stewindler, all adjoining properties; and the Rawhide, distant about a mile from the power house. The air is compressed by a Rand 25-drill duplex tandem compound engine, electrically driven, and having a capacity of about 2,800 cu. ft. per min. of free air at sea level. A full equipment of Rand Little Giant machine drills has also been put in at each mine.

BOOKS, ETC., RECEIVED.

United States Geological Survey.

"Mineral Resources of the United States, 1905." By David T. Day, chief of Division of Mining and Mineral Resources. Pages, 1369.

"Black Sands of the Pacific Slope in 1905." By David T. Day and H. Richards. From "Mineral Resources of the United States, 1905." Pages, 84.

"Production of Gas, Coke, Tar, and Ammonia in 1905." By Edward W. Parker. From "Mineral Resources of the United States, 1905." Pages, 31.

Department of the Interior, Mines Branch, Ottawa.—"Report on the Experiments made at Sault Ste. Marie, Ontario, under Government Auspices, in the Smelting of Canadian Iron Ores by the Electro-thermic Process." By Eugene Haanel, Ph. D. Pages, 149; illustrated by diagrams and half-tones.

Department of Lands and Forests, Ontario.—"Report of the Bureau of Mines, 1906." Vol. XV. Part II. "Clay and the Clay Industry of Ontario." By M. B. Baker. Pages, 120; illustrated.

California State Mining Bureau.—"The Auriferous Black Sands of California." By J. A. Edman, E. M. Bulletin No. 45; issued by the State Mining Bureau, San Francisco, under the direction of Lewis E. Aubrey, state mineralogist. Pages, 22; illustrated. Price, ten cents.

BOOKS REVIEWED.

The Metallurgy of the Common Metals by Leonard S. Austin, professor of metallurgy and ore dressing at Michigan College of Mines. 107 pages, 6½ x 9 in. freely illustrated; published by the *Mining and Scientific Press*, San Francisco. Cloth, \$4 (plus postage 16 cents).

In his preface to this book the author says: "This outline of the metallurgy of the common metals, namely, gold, silver, iron, copper, lead, and zinc, is devoted to the description of the processes of winning the metals from their ores and to the refining of those metals, except iron, the metallurgy of which is treated only to the point where pig iron is obtained. Following the description of ores, as well as of the fuels used in treating them, and the materials of which the furnaces are composed, we come to their sampling, for the determination of their exact value before treatment. Attention is next given to

the subject of thermo-chemistry as applicable to igneous methods of extraction. The winning or reduction of the various metals is then taken up in order and is followed by a description of the methods of refining them. Finally, the commercial phases of the question have consideration, since the processes must be conducted in a profitable way."

As an example of the scope of the author's work in what he intimates is but an "outline" of the general subject, the following narration of the sub-heads of the commercial section of the book will serve to indicate that notwithstanding necessary space limitations, the subject is comprehensively though briefly treated. These sub-heads are, respectively: (1) Location of Reduction Works; (2) Handling of Materials; (3) Organization of a Metallurgical Company; (4) Investment Required on Original Plant; (5) Profits; (6) Organization; (7) General Remarks on Management and Labour; (8) The Purchasing of Ores in the Rocky Mountain States; and (9) The Marketing of Ores and Metals.

A number of half-tone blocks and line-cut diagrams serve to effectively illustrate this interesting volume, thereby increasing its usefulness. The letter press is excellent and the binding serviceable.

Mine Timbering, by Wilbur E. Sanders, Bernard MacDonald, Norman W. Parlee, and others. 176 pages; 6½ by 9½ in.; illustrated by numerous diagrams. Published by Hill Publishing Company, London and New York. Cloth, \$2 postpaid.

This book is a collection of articles previously printed in the "Engineering and Mining Journal," "The Mineral Industry," and the "Transactions" of various societies. In the absence of any treatise on the important subject of "Mine Timbering," which in published hand-books and text-books on mining is as a rule dealt with only in a superficial way, it has appeared worth while to publish in book form the articles, contained herein, these being offered as a series of essays rather than as a complete treatise on the subject dealt with. Many important details are gone into fully, and the practical information thus placed in readily accessible form is rendered more valuable by numerous object lessons in the shape of diagrams and other illustrations. The fact that methods of timbering adopted in mines in various countries—several of the United States, British Columbia, Queensland, Tasmania, etc.—are dealt with, thus showing different styles to meet diverse conditions, makes the book of greater use to those whose business it is to familiarize themselves with the best methods, consequently it should be widely read by mining men.

Examination Questions for Certificates of Competency in Mining, 532 pages, 6½ x 9 in., illustrated. Published by the Scranton, Pa., International Textbook Company. Cloth, \$3.50.

This book contains examination questions for certificates of competency as mine inspector, mine foreman, mine manager, fire-boss, hoisting engineer, etc., as given by the State Examining Records, together with answers prepared and edited by the editors of *Mines and Minerals*. In addition to dealing comprehensively with its subject matters in their relation to the United States, British Columbia has attention, and as well, brief reference is made to Nova Scotia.

The twenty-eight chapters, comprising the volume contain 2,570 questions, with answers thereto. This compilation is believed to faithfully and fully represent the range of subjects covered at the present time by examinations for certificated mining positions in the United States and Canada. It is intended to assist those preparing themselves for official examinations for such positions. It is, therefore, not intended as a text-book but merely as an aid in connection with text books on mining.

No deposits of tin, of an economic nature, have yet been discovered in Canada.

MINING MEN AND AFFAIRS

E. H. Finch is superintendent of the mine at Rossland on the Le Roi No. 2, Ltd.

S. S. Fowler of Nelson, who recently went to New York and other Eastern points, is back again.

Edward St. Louis of London, Yag and, has been examining the Lenora mine at Mt. Sicker, Vancouver Island.

S. W. Emmerson of Philadelphia, Penn., U. S. A., has been examining mining properties in the Kamloops district.

Charles Rundsberg of Salt Lake City, Utah, U. S. A., has been appointed superintendent of the Dominion Copper Co.'s mines in the Boundary district.

R. H. Stewart, manager of the mines of the Consolidated Mining and Smelting Company of Canada, returned to Rossland on May 11 from a visit to Wallace, Idaho.

Newton W. Emmens, formerly of Pittsburg, Pa., now manager of the Silver Dollar and Broadview mines in the Lardeau district, was a recent visitor to Victoria.

J. C. Haas of Spokane, Washington, U. S. A., was in the Boundary district lately in connection with the further development of the Golconda and on other mining business.

Horace V. Winchell of St. Paul, Minnesota, U. S. A., chief geologist for the Great Northern Railway Company, has been visiting mines and smelters in the Boundary district.

N. F. McNaught when in Nelson about the middle of May stated that in the Silverton section of Slovan district prospects for the ensuing season were excellent, especially for mining.

Dr. Eugene Haanel of Ottawa, late superintendent of mines for the Department of the Interior, has been appointed director of the Mines Branch of the newly created Department of Mines.

Colgate Hoyt, president of the British Columbia Copper Company, has been looking over the several mines and the copper smelting works of the company in the Boundary District.

B. P. Little, superintendent for the Diamond Vale Coal and Iron Mines, Ltd., operating in the Nicola district, on May 10 left for Pittsburg, Pennsylvania, to attend the golden wedding celebration of his parents.

W. H. Wiley, who reached Whitehorse from California early in May, is examining a number of mineral claims in Whitehorse copper camp bonded during the winter for a Pennsylvania syndicate.

Bernard MacDonald, for years in charge of mines at Rossland, and later managing mines at Guanajuato, Mexico, has opened an office in New York as mining engineer. Mexican mines will be a specialty with him.

John B. Hobson, manager of the two Guggenheim companies operating in the Cariboo district, has gone up to Quesnel Forks to direct the season's hydraulic mining work on the big placer gold property formerly owned by the Consolidated Cariboo Hydraulic Mining Company.

A. J. G. Swinney, known in the Lardeau district of British Columbia, where he was for some time in charge of the Ferguson Mines, Ltd.'s Silver Cup and Nettie L. mines, and chlorination mill, has left England to take up work in the Deccan goldfields, India.

H. J. Baron, who three years ago made a trip through the mining districts of southern Kootenay and southern Yale in the interests of a Denver, Colorado, mining journal, is now editor of the journal of the Western Association of Technical Chemists and Metallurgists.

H. E. T. Haultain, formerly of Nelson, and for the past 18 months or so manager of the production part of the Canada Corundum Co.'s business, has been appointed that company's general manager, with headquarters at Craigmont, Ontario.

W. J. Thompson and W. J. Thompson, a syndicate which last winter purchased the Arctic Chief and Best Chance copper claims in southern Yukon is at Whitehorse directing development work on these properties.

W. C. Thomas, resident general manager for the Dominion Copper Co., operating copper mines and smelting works in the Boundary district, recently examined some copper properties in the Similkameen district of that province.

T. J. Vaughan-Rhys, formerly in charge of the Van Anda Copper and Gold Mines Co.'s Cornell and Copper Queen mines on Texada Island, and now operating mines in Mexico, lately visited British Columbia. He is mining on Valdez Island.

Geo. W. Maynard of New York arrived at Whitehorse, southern Yukon on May 14, and has since been engaged in examining a number of copper properties under bond to Col. W. S. Thomas of Harrisburg, Pa., representing the Pennsylvania Syndicate.

Dr. Alfred Stansfield, professor of metallurgy at McGill University, Montreal, Quebec, after accompanying the McGill Summer Mining School on its western itinerary, visited the Tye Copper Co.'s smelting works at Ladysmith, Vancouver Island.

Geo. H. Collins of Greenwood, formerly superintendent of the mines at Phoenix now operated by the Dominion Copper Co., has removed to the coast after having been connected with mining in the Boundary district for about eleven years. For the present he is making Vancouver his headquarters.

D. R. Irvine, manager for the Berry Creek Mining Co., Ltd., has gone up to Cassiar with 25 men to resume hydraulic operations on his company's placer gold leases on Thibert Creek. Warburton Pike, having lately arrived from England, whence he went on one of his periodical visits, expects to shortly join Mr. Irvine on Thibert Creek.

Dr. G. C. Hoffman, LL.D., F. I. C., F. R. S. C., of Ottawa, Ontario, has resigned the offices of assistant director, chemist, and mineralogist to the Department of Geological Survey, Canada, to which he was appointed on July 1, 1883. He entered the employ of the government on September 1, 1872, so has been in that service nearly thirty-five years of which twenty-four were devoted to the duties he now voluntarily relinquishes.

Albert P. Low, deputy head and director of the Geological Survey Department of Canada, has been appointed deputy minister of the newly-created Dominion Department of Mines. Hon. Wm. Templeman is the first minister of mines, in charge of the new department, which consists of two branches, respectively the "Mines Branch" and the "Geological Branch."

H. H. Claudet has returned to Rossland after several months' absence in Colorado and Mexico. Whilst away he installed two of the Elmore Vacuum Oil Concentration Process plants in Mexico—one each at Nacoazari and San Luis Potosi—and one at Denver, Colo. Two similar plants are to be installed in Kootenay district of British Columbia, and one in Lake Superior district, Ontario.

W. A. Carlyle has resigned the position of general manager of the Rio Tinto copper mines, Spain, to which he was appointed towards the end of 1899. During 1896 and 1897 Mr. Carlyle was provincial mineralogist of British Columbia and resigned that office early in 1898 to become general manager for the British company then owning the Le Roi mine at Rossland. He is now practising as a consulting engineer with headquarters in London, England.

Dr. J. Bonsall Porter, professor of mining at McGill University, Montreal, Quebec, after having been in charge of the McGill Summer Mining School during the mem-

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Mining Property for sale on Working Bond, or will give interest in return for development to shipping stage. Situated south of Similkameen River, two miles west of Hedley. Ore body consists of four feet of mispickel (arsenical iron pyrites) ore carrying shipping values in gold from \$12 to \$20 per ton, and 15 feet of \$3 ore. Formation is the same sedimentary that crosses the Nickel Plate ground and some of the ore is similar to the product of that mine. Timber and water power acquired. Great Northern railway, in course of construction, crosses lower part of property; 1,500-ft. gravity tramway would deliver ore to railway.

HERBERT B. BROWN,
Hedley, Similkameen, B. C.



SYNOPSIS OF CANADIAN HOMESTEAD REGULATIONS.

Any available Dominion Lands within the Railway Belt in British Columbia, may be homesteaded by any person who is the sole head of a family, or any male over 18 years of age, to the extent of one-quarter section of 160 acres, more or less.

Entry must be made personally at the local land office for the district in which the land is situate.

The homesteader is required to perform the conditions connected therewith under one of the following plans:

(1) At least six months' residence upon and cultivation of the land in each year for three years.

(2) If the father (or mother, if the father is deceased), of the homesteader resides upon a farm in the vicinity of the land entered for, the requirements as to residence may be satisfied by such person residing with the father or mother.

(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

Six months' notice in writing should be given to the Commissioner of Dominion Lands at Ottawa of intention to apply for patent.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2000 lbs. shall be collected on the gross output.

W. W. CORY,

Deputy of the Minister of the Interior.

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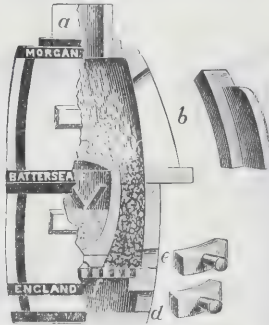
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NOTES AND COMMENTS.

Publication of the information concerning the occurrence of platinum in the Fraser River, to which reference was made last month, has again had to be deferred.

On page 248 of this issue the payment of dividends by several British Columbia mining companies is noted. It is evident that the number of profit-earning mines in the Province is increasing.

The Atlin Consolidated Mining Company, a Guggenheim organization, has commenced the season's work on Tar Flats, Pine Creek, Atlin district, where it last year installed a 70-ton steam shovel capable of handling 3,000 cu. yd. of gravel per diem.

The Cranbrook Prospector says: Three hydraulic plants are now in operation on Wild Horse Creek, Fort Steele mining division. Not since 1900 has there been more activity shown in placer mining on the historic old creek than is going on at the present time.

A new record was made at the British Columbia Copper Company's smelting works at Greenwood, Boundary district, during the last week in June, when 13,647 tons of copper ore were smelted. Of this quantity 9,209 tons came from the company's mines; the remainder was custom ore.

The recent finding of two large nuggets of gold in Atlin district has been reported. One was in the Otter Hydraulic Company's sluice box on Otter Creek and weighed nearly 30 oz. The other, which weighed 56 oz., was found on Spruce Creek on unoccupied ground covered with tailings.

Among other interesting matter held over by reason of lack of space this month is the provincial mineralogist's review of the "Developments of the Year," his introductory comment on which was: "There have been few developments or occurrences during the past year that require special notice. Mining is becoming more a settled business, by the elimination, to a large extent, of visionary schemes."

A despatch from Slocan City to the *Nelson Daily News* states that: "Work has been suspended at the Ottawa mine, pending the arrival of the Pittsburg owners, when a decision will be made as to the method of work in the future." The manager of the mine is incapacitated, being ill with rheumatism.

The Payne mine and concentrating mill near Sandon, Slocan district, have been bought at public auction by Senator Forget of Montreal, Quebec, for \$60,000. Prior to 1902 dividends totalling \$1,363,000 were paid out of the earnings of this mine. The concentrator, with appliances for saving zinc, was constructed in 1901.

The addition of the northern part of the Skeena division of Cassiar district to the copper producing sections of the Province is worthy of note. Its officially recorded production of 293,269 lb. of copper in 1906 as against none in 1905 and only 17,407 lb. for all previous years indicates substantial progress in lode mining last year.

On May 11 the *Mining and Scientific Press*, of San Francisco, California, published an article on "Mining in Honduras," written for that journal by Horace G. Nichols. This contributor is, we understand, now manager for the Ymir Gold Mines, Ltd., with gold-quartz mine, 80-stamp mill, and cyanide plant in the Ymir section of Nelson mining division.

According to the *Nelson Daily News*, S. S. Fowler, manager of the Canadian Metal Company, who lately returned from an extended trip in the East, says that the appeal of the American smelters on the zinc tariff question concerning the importation of zinc ore from Canada into the United States, had been heard, but that so far as he could learn no decision had been handed out yet.

The *MINING RECORD* was criticized and condemned by the *Vernon News* and *Victoria Week* last year because of its expressed disbelief in a successful outcome of operations at the British Empire mine so long as "Windy" Young had anything to do with the management of it. The gold commissioner for the Vernon mining division officially reported for the year 1906 as follows: "On the British Empire and Royal Standard claims a 5-stamp mill ran for 120 days, and gold was recovered on the plates." On reference to Table IX. of the "Annual Report of the Minister of Mines for 1906," we find that Similkameen, Nicola, and Vernon divisions are together credited with a production in 1906 of 6 oz. of lode gold, value \$124. We are curious to know whether the British Empire production for a run of 120 days was included in the official return of 6 oz. If so the *MINING RECORD* was more than justified in its doubt. If not, what explanation has "Windy" Young to make for not having observed the law requiring mine managers to make returns of production?

ANNUAL REPORT OF THE MINISTER OF MINES FOR THE YEAR 1906.

THE ANNUAL REPORT of the Minister of Mines for British Columbia for the year ended December 31, 1906, which is the official account of the year's mining operations in the Province, while unavoidably not issued with the accustomed promptitude of former years, is of more than ordinary interest for several reasons. In particular many engaged in, or otherwise concerned about, mining in British Columbia are pleased to have at their disposal the provincial mineralogist's survey of the condition of the industry, based upon the reports supplied to the bureau of mines by gold commissioners and mining recorders and, what is of much more importance, on the returns required by law to be sent in by mine owners or operators. The statistics of production, carefully compiled from the most reliable data obtainable and presented in tabulated form so as to clearly exhibit the position from a comparative point of view, are of much practical value to those using the information thus made conveniently accessible.

The several special reports made by the provincial mineralogist and the provincial assayer (for to the latter was delegated the duty of visiting and reporting upon two or three districts to which prospectors have been giving attention) are of general interest. Chief among these is that relating to the Peace River country, concerning which there had previously been but little recent information available to the public. The provincial mineralogist's detailed description of the country passed through is given in diary form, and it contains much intelligence that will be found useful by travellers proceeding to that outlying district. A summary precedes the narrative of the daily journeyings and observations, and this is reprinted on pp. 219-230 of this number of the *MINING RECORD*. The information being authentic and recent will be generally acceptable. The numerous excellent half-tone views adequately illustrate the physical features and general character of the country passed through. Some of these, through the kind courtesy of the bureau of mines, have been used in this issue. Other plates depicting mountain and river scenery along the route travelled, are too long for use in the pages of this journal, which is much regretted since they furnish instructive object lessons relative to the comparatively unknown country under notice.

As far as practicable there have been reprinted in this month's *MINING RECORD* the statistical tables and the comments of the provincial mineralogist on the year's mining progress and mineral production. Space limitations have prevented more being done this month in this direction, but the parts of this section of the report selected for reprinting will be found to contain figures and facts directly indicating the position of the mining industry of the Province. It has been found necessary to omit particulars of some of the branches of the work done by or under the bureau of mines. These include the practical

work of the provincial assay office, and that of the boards of examiners of assayers and coal mine officials, respectively, and of the inspectors of mines.

Several reports by members of either the Geological Survey of Canada or the United States Geological Survey are reprinted in the volume under review. The reports of Provincial gold commissioners and mining recorders give much information concerning mining in those districts in which it has been in active progress; in other instances the official statements have necessarily been brief and of comparatively little importance. It appears evident that there has been exercised a wise discrimination in the choice of matter in this connection, for there is little, if any, useless "padding" in the reports of individual districts or divisions.

A serviceable addition has been made to the tabulated information printed yearly at the end of the Annual Report. This is a three-page table showing the "Metalliferous Shipping Mines in 1906," with the names of shipping mines arranged under mining divisions, and showing in separate columns, (1) name of mine or group, (2) locality, (3) owner or agent, (4) address, and (5) character of ore.

The comprehensive nature and markedly advantageous arrangement of the large amount of information contained in the Annual Report reflect credit upon the provincial mineralogist, on whom devolved the work of preparing it for the printer and supervising its publication. The varied illustrations—graphic tables, diagrams, sketch maps, and half-tone reproductions of photographs (of which there are about 60)—add materially to the general excellence of this report, which has been well printed at the Provincial Government printing office, and this, too, at a time when handicapped by a rush of other official work. Too much praise can scarcely be accorded for the artistic finish of the half-tones, some of them most effective in tint, in printing which W. H. Clark, foreman of the press room, has well maintained his reputation for high-class work. Most of the photographs reproduced were taken either by W. F. Robertson or Harold Nation who accompanied him on his Peace River journey as an assistant, or, in the case of Vancouver Island and Portland Canal views, by Herbert Carmichael, provincial assayer. Many of the engravings were made by the British Columbia Engraving Company, Victoria; the others in Chicago.

Altogether this Annual Report of the Minister of Mines for British Columbia is a decidedly useful and creditable publication and it is distinctive in that it gives details of the largest mineral production in any one year in the history of mining in British Columbia.

Instructions have been received at Whitehorse to put men at work on the Bullion Creek Hydraulic Company's placer gold claims in southern Yukon.

It is reported from Dawson that the Guggenheim interests have acquired the Treadgold, Northway Hydraulic, Yukon Consolidated and other properties for a large monetary consideration.

STATISTICS OF MINERAL PRODUCTION OF BRITISH COLUMBIA IN 1906.

STATISTICAL TABLES of the mineral production of British Columbia in 1906 given in the "Annual Report of the Minister of Mines," are of much value, exhibiting as they do the results attained in each of the beds they cover as well as the total for all years. The official comments of the provincial mineralogist on these tables, together with such as of them as it is practicable to here reproduce, follow:

TABLE I.—TOTAL PRODUCTIONS FOR ALL YEARS UP TO AND INCLUDING 1906.

Gold, placer	\$ 68,721,103
Gold, lode	41,915,697
Silver	25,586,008
Lead	17,625,739
Copper	33,546,578
Coal and Coke	79,304,768
Building stone, bricks, etc.	5,540,700
Other metals	270,000
Total	\$273,643,722

Table I. shows the total gross value of each mineral product mined in the Province up to the end of 1906. From this it will be seen that coal mining has produced more than any separate class of mining a total of \$79,304,768—followed next in importance by placer gold at \$68,721,103, and third by lode gold at \$41,915,697. The metal gold, derived from both placer and lode mining, amounts to \$109,730,800, the greatest amount derived from any one metal or mineral, the next most important being copper, of a total gross value of \$33,546,578, followed by silver at \$25,586,008, and lead at \$17,625,739.

TABLE II.—PRODUCTION FOR EACH YEAR FROM 1890 TO 1906 (1891-1899).

1852 to 1889 (inclusive)	\$ 71,981,634
1890	2,608,803
1891	3,521,102
1892	2,978,530
1893	3,588,413
1894	4,225,717
1895	5,643,042
1896	7,507,956
1897	10,455,000
1898	10,060,861
1899	12,302,101
1900	15,044,761
1901	20,088,780
1902	17,850,310
1903	17,495,954
1904	18,977,359
1905	22,401,425
1906	24,980,546
Total	\$273,643,722

Table II. shows the values of the total production of the mines of the Province for each year from 1890 to 1906, during which period the output increased nearly ten-fold. It reached a production for the past year valued at \$24,980,546, or more than double what it was in 1899.

Table IV. gives the amounts, in the customary units of measure, and the values, of the various metals and other minerals which go to make up the grand total of the mineral production of the Province for 1906, and also, for purposes of comparison, similar data for the two immediately preceding years.

The table shows that in 1906, as compared with 1905, there was a decrease in the production of placer gold of some \$20,900 and of lode gold \$302,463, making for this metal a total decrease of \$323,363.

The amount of silver produced in 1906 was 2,990,262 oz., having a gross value of \$1,897,320, a decrease from 1905 of \$74,498, due chiefly to the decreased production of the Slocan district.

The table also shows an output of lead in 1906

amounting to 52,408,217 lb., valued at \$2,667,578, which although a decrease from the production of the last preceding year of 4,172,486 lb. is still greater than that of any other year since 1900, but owing to the greatly increased market value of the metal, and in spite of the materially decreased amount produced, the value of the product for 1906 shows an increase over that of 1905 of \$268,556.

As it has been impossible as yet to collect accurate statistics regarding building stone, lime, bricks, tiles, etc., these have been estimated.

Table V. shows the proportions of the total mineral production made in each of the various districts into which the Province is divided. It will be noted that in 1906 the Boundary (Yale) district again has the honour of first place, followed in order of output by the Coast district and East Kootenay, with West Kootenay, for many years the Province's greatest producer, only fourth on the list. The Coast and East Kootenay districts, however, owe a considerable percentage of their outputs to the coal mines

TABLE IV.—AMOUNT AND VALUE OF MINERAL PRODUCTS FOR 1904, 1905 AND 1906.

	Customary Measure.	1904.		1905.		1906.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold, placer.....	Ounces	55,765	\$ 1,115,300	48,465	\$ 969,300	.....	\$ 948,400
" lode.....	"	222,042	4,589,608	238,660	4,933,102	224,027	4,630,639
Silver.....	"	3,222,481	1,719,516	3,439,417	1,971,818	2,990,262	1,897,320
Lead.....	Pounds	36,646,244	1,421,874	56,580,703	2,399,022	52,408,217	2,667,578
Copper.....	"	35,710,128	4,578,037	37,692,251	5,876,222	42,990,488	8,288,565
Coal.....	Tons, 2,240 lb.	1,253,628	3,760,884	1,384,312	4,152,936	1,517,303	4,551,909
Coke.....	"	238,428	1,192,140	271,785	1,358,925	199,227	996,135
Other materials.....	" .....	.....	600,000	.....	800,000	.....	1,000,000
Totals.....	.....	.....	\$18,977,359	.....	\$22,461,325	.....	\$24,980,546

TABLE V.—PRODUCTION OF MINERAL BY DISTRICTS AND DIVISIONS.

Name.	Divisions.			Districts.		
	1904	1905	1906	1904	1905	1906
Cariboo District .....	.....	.....	.....	\$ 474,600	\$ 406,000	\$ 405,400
Cariboo mining division.....	\$ 313,000	\$ 300,000	\$ 355,800	.....	.....	.....
Quesnel	150,000	96,000	39,600	.....	.....	.....
Omineca	11,600	10,000	10,000	.....	.....	.....
Cassiar District .....	.....	.....	.....	558,573	504,372	555,599
East Kootenay District .....	.....	.....	.....	3,210,573	5,339,154	5,171,024
West Kootenay District .....	.....	.....	.....	5,806,070	5,421,859	4,660,352
Ainsworth division.....	168,023	100,273	268,111	.....	.....	.....
Nelson	466,683	532,564	515,709	.....	.....	.....
Slocan	1,236,858	970,544	532,228	.....	.....	.....
Trail Creek	3,760,866	3,672,828	3,223,587	.....	.....	.....
Other parts	173,640	145,650	120,717	.....	.....	.....
Lillooet District .....	.....	.....	.....	34,583	32,584	20,314
Yale District .....	.....	.....	.....	4,190,281	6,483,504	8,779,711
Osoyoos, Grand Forks and Greenwood divisions	4,110,366	6,356,410	8,689,470	.....	.....	.....
Similkameen division.....	2,500	1,533	2,624	.....	.....	.....
Yale	77,415	125,561	78,617	.....	.....	.....
Coast Districts (Nanaimo, Alberni, Clayoquot, Quatsino, Victoria) .....	.....	.....	.....	4,702,679	4,273,852	5,388,146
Totals .....	.....	.....	.....	\$18,977,359	\$22,461,325	\$24,980,546

TABLE VII.—PRODUCTION OF LODE MINES.*

Year.	Gold.		Silver.		Lead.		Copper.		Total.
	Oz.	Value.	Oz.	Value.	Lb.	Value.	Lb.	Value.	
1887		\$	17,690	\$ 17,331	9,100	\$ 9,216			26,547
1888			79,780	75,000	674,500	29,813			104,813
1889			53,192	47,873	101,341				154,191
1890			70,427	73,948	50	50			218,000
1891			4,300	4,000	50				4,000
1892			77,160	66,935	808,420	33,064			8,000
1893	1,170	23,404	227,000	195,000	2,135,023	78,996			4,000
1894	6,252	125,014	746,379	470,219	5,662,523	169,875	324,680	16,234	781,342
1895	8,264	785,271	1,496,522	977,229	11,475,400	532,255	952,840	47,642	2,342,397
1896	62,259	1,244,180	3,135,343	2,100,689	23,197,500	721,384	3,818,556	190,926	4,257,179
1897	106,141	2,122,820	5,472,971	3,272,836	34,411,510	1,390,517	5,325,180	266,258	7,952,431
1898	110,061	2,201,217	4,292,401	2,375,841	31,693,559	1,077,581	7,271,678	874,781	6,529,420
1899	138,315	2,857,573	2,939,413	1,663,708	25,442,100	878,870	7,722,591	1,351,453	8,700,400
1900	167,153	3,453,381	3,958,175	2,309,200	63,530,200	2,691,887	9,997,080	1,615,289	10,009,757
1901	210,384	4,348,603	5,151,333	2,884,745	51,582,906	2,002,733	27,003,746	4,446,993	13,683,044
1902	236,491	4,888,269	3,917,917	1,941,328	22,536,381	824,832	29,636,057	3,446,673	11,101,102
1903	232,831	4,812,616	2,990,204	1,521,472	18,000,200	744,000	10,000,000	1,100,000	11,571,367
1904	222,042	4,589,608	3,222,481	1,719,516	36,000,200	1,421,874	10,000,000	1,100,000	12,300,035
1905	238,660	4,933,102	3,439,417	1,971,818	56,580,703	2,399,022	37,692,251	4,446,993	15,181,164
1906	224,027	4,630,639	2,990,262	1,897,320	52,408,217	2,667,578	42,990,488	8,288,565	17,484,102

Totals 1,995,050 41,015,697 44,288,567 25,586,008 443,925,292 17,625,739 243,405,196 35,546,578 119,774,022

*Not included in above is iron and zinc ore of a total value of \$2,500,000.

Note.—The information as to production in the earlier years is obtained from the "Mineral Statistics and Mines" for 1896, Geological Survey of Canada.

situated within their limits, whereas in the other districts the production is entirely from lode mining.

Table VII., Production of Lode Mines, relates entirely to the lode mines of the Province, and shows the amounts and values of the various metals produced each year since 1887—the beginning of such mining in the Province. The gross value of the product of these mines is \$119,774,022. The production in 1906 was \$17,484,102, an increase over the last preceding year of \$2,303,938, or about 15.2 per cent.

Official comment on other tables published in the report, and for which the MINING RECORD has not space this month, is as follows:

Table III., Mineral Production of British Columbia, presents in graphical form the facts shown by figures in other tables and demonstrates to the eye the rapid growth of lode mining in the Province and also the fluctuations to which it has been subject. It will be seen that although coal mining has been a constantly increasing industry during this whole period of 20 years, lode mining did not begin practically until 1894, since when it has risen with remarkable rapidity, though not without interruption, until now it has nearly reached the \$17,500,000 line, and the total production has nearly reached the \$25,000,000 line.

Table VI., Yield of Placer Gold to Date, gives the statistical record of the placer mines of the Province from 1858 to 1906, and shows a total production of \$68,721,103. The output for 1906 was \$948,400—a decrease of about two per cent. as compared with 1905, and due to a dry season with a shortage of water for hydraulic mining.

Table VIII., Coal and Coke Production per Year to Date, contains the statistics of production of the

coal mines of the Province. The total amount of coal mined to the end of 1906 is 24,144,633 tons (2,240 lb.), value \$72,815,423. Of this there was produced in 1906 1,517,303 tons, valued at \$4,551,909, a larger amount than had been produced in any previous year. In these coal production figures the coal used in making coke is not included, as such coal is accounted for in figures of output of coke.

The amount of coal used in making coke in 1906 was 381,773 tons, from which was produced some 199,227 tons of coke, worth \$996,135, a decrease of some 72,558 tons from the total of coke produced in 1905. These figures are to a certain extent misleading, however, as in 1905 some 3,694 tons of coke were put into stock, whereas in 1906 all the coke made was sold, together with 13,009 tons taken from stock, making the total coke sales for the latter year 210,897 tons. The production of coke in 1906 would have been much greater than it was but for the very urgent demand for coal and the general scarcity of labour, which taxed the companies' resources to keep up a sufficient supply of coal. A strike at the Crow's Nest Pass collieries in the autumn also greatly diminished the output.

Table IX., Production of the Metalliferous Mines, gives the results of production in the Province (excepting coal mines) for the years 1903, 1904, 1905 and 1906, and the districts in which such productions were made, showing the tonnage of ore mined in each district with its metallic contents and market value. The total tonnage of ore mined in the Province during 1906 was 1,903,872 tons, having a gross value (together with that of placer gold and silver) of \$10,000,000.

Table X., Comparative Mineral Production, compares graphically the output of mineral products in

British Columbia with that of similar products in all the other provinces of the Dominion, and shows that in 1906 British Columbia produced of the metals and coal an amount over 757. of that of all the other Canadian provinces combined.

PROGRESS OF MINING.

Provincial Mineralogist's Comments on Last Year's Progress.

A MATERIAL INCREASE in both tonnage and gross value is the gratifying record of the mineral production of British Columbia in 1906 as compared with that of any previous year. The official review of the year's progress is here shown:

The value of the mineral products of the Province grows steadily greater, each year showing a material increase over the preceding year. The production for 1906 was \$24,980,546, which is 11.2 per cent. greater than that of 1905, 31.6 per cent. greater than in 1904, and 42.8 per cent. greater than in 1903.

An analysis of the returns shows, however, that this increase was due chiefly to the Boundary and Coast districts, with a slight increase in Cassiar. East Kootenay and Cariboo districts about held their own, while Lillooet and West Kootenay showed a considerable decrease. In the latter district, however, Ainsworth more than doubled its output, Rossland and Nelson nearly maintained their positions, but Sloean and the rest of the district showed a marked decrease.

The tonnage of ore mined in the Province, exclusive of coal, was 1,963,872 tons, some 257,193 tons, or 15 per cent., greater than in 1905. The following table shows the percentages of such tonnage and values derived from the various districts of the Province:

	Tonnage, Per cent.	Values. Per cent.
Boundary (Yale) district.....	60.2	44.2
Trail Creek (Rossland) mining division	14.2	16.3
Fort Steele (East Kootenay) mining division	9.2	15.1
Sloean district	0.8	2.7
Coast "	11.1	6.5
Miscellaneous and other districts	4.5	15.2
	100.0	100.0

The number of mines from which shipments were made in 1906 was 154; and of these only 77 shipped more than 100 tons each—practically no change from 1905. Some 41 mines shipped in excess of 1,000 tons each, of which 14 are situated in the Boundary district, eight in Nelson mining division, six in Trail mining division, and five on the Coast. The following table shows the number of metalliferous mines which shipped ore, together with the location of these

mines and the number of men employed both above and below ground:—

TABLE SHOWING DISTRIBUTION OF SHIPPING MINES IN 1906.

	Tons of Ore Shipped.	No. of Mines Shipping.	Men em- ployed.
Cassiar:			
Skeena	5,394	2	85
East Kootenay:			
Fort Steele	180,036	3	378
Windermere	243	6	37
West Kootenay:			
Ainsworth	19,431	14	115
Nelson	50,135	23	363
Sloean	14,973	54	337
Trail	279,527	10	750
Other Divisions	8,715	5	79
Lillooet	215	1	5
Yale:			
Boundary	1,182,517	26	1,111
Ashcroft-Kamloops .	3,837	1	50
Similkameen-Vernon.	3	1	2
Coast	218,846	8	406
Total	1,963,872	154	3,718

The number of men employed in 154 metalliferous shipping mines was 3,718—2,535 below and 1,183 above ground—and in 96 non-shipping mines, 265—145 below and 120 above,—making a total of 3,983.

COAL.*

During 1906 the actual production of coal in British Columbia was confined to the two well-known districts, the collieries in vicinity of the Crow's Nest Pass and the collieries on Vancouver Island.

In the former of these districts the Crow's Nest Pass Coal Company operated collieries at Michel, Coal Creek and, for the first portion of the year, at Carbonado, but on April 1 this last colliery was closed down.

The collieries on Vancouver Island were operated by two companies, viz., the Western Fuel Company at Nanaimo, and the Wellington Colliery Company at Ladysmith and Comox.

GOLD.

Placer Gold.—The production of placer gold was about \$948,400, or 2.2 per cent. less than that of 1905. This falling off, though slight, is general and represents the lessened work of the individual miner, whose successors, the large companies, have not as yet got into satisfactory operation.

Atlin district produced very nearly as much gold as in 1905, chiefly the work of comparatively small companies, although in this district individual miners are still at work, but the ground suited for this class of mining is gradually diminishing.

The two large dredges installed in this district have

*For additional information on coal mining see article on pp. 241-243.

been practically abandoned, as the ground upon which they were working was found unsuitable for dredging operations.

A big steam-shovel plant has been installed on shallow ground, and from present indications promises to be a large producer. The small shovel, the first installed in the district, has not been a commercial success, owing to the quite inadequate arrangements for handling and washing the dirt lifted.

In the Dense Lake section of Cassiar, despite the difficulties of transportation, one hydraulic company recovered between \$20,000 and \$25,000 in gold; a second company will probably be in operation in 1907. Here, however, the individual miner has almost disappeared.

In Cariboo district, Cariboo mining division showed a marked increase over the preceding year, about 18.6 per cent., chiefly from small hydraulic enterprises, but the Quesnel division showed a decrease of about 30 per cent., due to the fact that the largest producing company did little mining, being taken up with large operations for increasing its water supply.

Fort Steele district continues to produce a little gold from the old creeks, but the quantity is yearly diminishing.

The bars on the Thompson and Fraser Rivers have been very disappointing, and the dredges thereon have not been successful.

GOLD FROM LEAD MINING.—The value of the gold produced from lead mining was \$4,639,639, of which about 95 per cent. was recovered from the smelting of copper-bearing ores. There were few stamp mills in operation since the Ymir ceased mining, only one at Hedley and another at Camberne.

SILVER.

The total amount of silver produced was 2,990,262 oz., valued at \$1,897,320, a decrease as compared with 1905 of about 449,155 oz. and in the value of the product of \$74,498.

About 77 per cent. of the silver is found in association with lead, in argentiferous galena, the remainder being found in conjunction with copper ores.

Fort Steele Mining Division produced 1,049,536 oz., about the same as in 1905, but the Slocan shows a decrease in output of 471,335 oz., or 45 per cent.

LEAD.

There was produced in the Province in 1906 some 52,408,217 lb. of lead, valued at \$2,667,578. Although this was a decrease of 4,172,486 lb. from the preceding year, the value, owing to the higher market prices, gave an increase of \$268,556, and was the highest amount ever received for the lead product of the Province, except in 1900.

With lead, as with its associated metal silver, the greater part of the production came from Fort Steele division, while the production of the Slocan in 1906 was only 55.1 per cent. of that of 1905, or 28 per cent. of the production of 1904.

The following table shows the output of the

various divisions, and the percentage of the total output for the year.

Mining divisions:	Lb.	Per cent.
Fort Steele	44,451,180	84.83
Armstrong	3,145,445	6.00
Slocan	2,917,577	5.57
Nelson	1,061,335	2.02
All other divisions	1,839,160	3.58
	52,408,217	100.00

For the whole of the year 1906 the market price of lead has been above £12 10s. in London; consequently the Dominion Government lead bounty has, during this period, been proportionately reduced.

COPPER.

The copper output in 1905 was the largest the Province had ever made, but the production of 1906 exceeded it by some 5,298,237 lb., an increase of 12.32 per cent., while the value of the total product this year was \$2,412,343 in excess of the preceding year, an increase of 41 per cent.

The production of copper in 1906 was 42,990,488 lb., having a gross value of \$8,288,565. This increase was chiefly attributable to the Boundary district, although there was an increase in the Coast district, but Rossland showed a decrease. Of the total output, the Boundary district produced 75 per cent., the Coast 12 per cent., and Rossland 10 per cent.

The following table shows the production of the various districts for the years 1904, 1905 and 1906:

District.	1904 Lb.	1905 Lb.	1906 Lb.
Boundary	22,066,407	27,670,644	32,226,782
Rossland	7,119,876	5,800,294	4,750,110
Coast	5,960,593	3,437,236	5,431,269
Yale-Kamloops	328,380	680,808	355,377
Nelson	220,500	92,663	216,034
Various districts	14,372	10,606	10,916
	35,710,128	37,692,251	42,990,488

The percentage of production for this three-year period was: Boundary district, 74.90 per cent.; Coast, 12.45; Rossland, 11.40; other districts, 1.25.

The average percentage of the total output of the various camps, based upon the copper recovered, were as follows:—

Boundary, 1.4 per cent.; Coast, 1.21 per cent.; and Rossland, 0.85 per cent. copper.

IRON ORE.

Iron Ore.—There was no iron ore mined in the Province during the past year, from the reason that there is no market for such a product there. There has been considerable prospecting work done in connection with the known iron deposits on the Coast, and schemes have been in consideration for the erection of blast furnaces, either in British Columbia or on Puget Sound.

Zinc Ore.—The production of zinc ore was small.

only some 651 tons, and the industry was practically at a stand still. In 1905, concentrating or "enriching" plants were erected for the production of concentrates that would assay about 50 per cent. zinc, for which there was a market in the United States, into which country they were admitted free of duty as "crude mineral"; but in 1906 a decision of the United States Customs department ruled that these concentrates were not "crude mineral," and, consequently, were subject to duty, which duty was so high as to be prohibitive, the result having been a suspension of zinc mining in British Columbia. This decision has, however, been appealed from, and on February 7, 1907, the United States General Appraisers reversed the decision, deciding that these concentrates were "crude mineral" and, consequently, free from duty.

The Commission, headed by W. R. Ingalls, of New York, and Philip Argall, of Denver, appointed by the Dominion Government to investigate the zinc resources of British Columbia, has published its report, which goes into the subject most thoroughly. Copies of this report can be obtained from the Mines Branch of the Department of the Interior, Ottawa.

Platinum.—Platinum continues to be found in small quantities in various parts of the Province, but as yet no systematic attempt has been made to save it. As noted in previous reports, it is found in alluvial washings in the Similkameen district, on Quesnel River in Cariboo, on Thibert Creek in Cassiar, and also in the Yukon. The latest find was on Fraser River, below Lillooet, from which district there was received a few ounces of the crude platinum sand, saved by a prospector in washing for gold, for which the provincial mineralogist was able to obtain some \$25 an oz. net cash.

Building Stone.—The quarrying of stone for building purposes has as yet only on the Coast taken the form of an industry, as in that district only has the use of stone for building become at all general. In a previous report descriptions were given of the more important quarries that had been opened up on the Coast, to which there is not much to add now, except to note that the general output of the quarries has nearly doubled in the last couple of years.

Brick.—The manufacture of red building brick is constantly increasing with the market. The greater consumption of brick, and consequently the greater production, is on the Coast, near Vancouver and Victoria, although scattered throughout the Interior are small yards supplying local demands, suitable clay being found in abundance.

Fire Brick.—The manufacture of fire brick formerly carried on at Comox has, as far as is known, ceased; although about 3,500 tons of fire clay were mined from the coal mines in the vicinity. A deposit of fire clay of apparently very fair quality is being developed near Vancouver, and a brick-making plant erected, the product of which has not, however, been on the market for a sufficient time to assure its reputation.

The manufacture of earthenware, such as sewer and drain pipes, chimney caps, flower pots, etc., has

been carried on near Victoria by the British Columbia Pottery Company, the output having a value of somewhere about \$80,000, while other firms have also been making drain tiles and pipes.

Lime.—The production of lime is naturally associated more or less closely with constructions of brick or stone, aside from its use in internal plastering, and, consequently, the greatest production has been on the Coast, the most extensively operated lime-kilns being situated at Victoria and on Texada Island, at both of which points a lime of almost theoretical purity is made, although the kilns are rather primitive and the economies of production have only begun to be introduced.

Cement.—Although other enterprises are in contemplation, the only concern at present manufacturing cement in British Columbia, to any extent, is the Vancouver Portland Cement Company, with works at Tod Inlet, some 14 miles from Victoria, a description of whose plant, as it then existed, was given in the Report of 1904, since which time the capacity of the plant has been about doubled and the demand for the cement will probably necessitate further enlargements in the near future. The value of the output in 1906 approached \$250,000.

Oil and Oilshales.—There has been no serious attempt made to develop the supposed oil fields in the Flathead Valley, southeast Kootenay, owing probably to the conflicting and questioned validity of titles to the various claims; but this matter has now been practically settled, and it is expected the coming season will see active operations tending to prove the field. Nothing further has been heard of the oilshales found in the vicinity of Harper's Camp, Cariboo, and no serious attempt has been made to prospect for oil in the Queen Charlotte Islands, where seepages were reported as found.

Labour troubles at the Marble Bay mine, Texada Island, have been amicably adjusted and shipment of ore to the smelter at Tacoma, Washington, U.S.A., resumed. Output runs ordinarily from 1,000 to 2,000 tons per month. The mine is owned by the Tacoma Steel Company.

B. D. Brown of New York, president of the Brown-Alaska Company and the Alaska Smelting and Refining Company, has sold his large interest in these companies to G. D. Mumford, who represents the other stockholders. The Brown-Alaska Company, having its head office in Seattle, Wash., owns and is operating the Mamie mine, near Hadley, Prince of Wales Island, Southeast Alaska, and the Outsiders' group near Maple Bay, Portland Canal, British Columbia. N. O. Lawton, formerly of Michigan, is its mine manager. The Alaska Smelting and Refining Company owns the smelting works at Hadley which were erected and, until lately, operated by Paul Johnson, who has been succeeded as manager by Thos. Kiddie. These works smelt the ores of the Brown-Alaska Company's mines and such custom ores as are obtainable. Mr. Mumford is now president of both companies.

PEACE RIVER VALLEY DISTRICT OF BRITISH COLUMBIA.

Report by Wm. Fleet Robertson, Provincial
Mineralogist.

FROM ESSINGTON TO EDMONTON, via
Skeena River, Babine and Stuart Lakes, and
Peace River, was a journey taken last summer
by the provincial mineralogist, whose report thereon

mines, the provincial mineralogist, during the summer of 1906, made a trip to, and an examination of, that portion of British Columbia lying east of the Rocky Mountains, but to the west of the 120th meridian of west longitude, and known as the Peace River Valley district of British Columbia. As this portion of the Province is at present most remote from transportation facilities of any sort, the time occupied in reaching it from Victoria was greater than was required to make the examination of the



From Essington to Hazelton—Hudson Bay Company's Steamer Ascending Skeena River.

is published in the "Annual Report of the Minister of Mines for 1906." A detailed description of the country passed through is given in diary form in the report. The following introduction and summary

district.

A route was selected embracing a stretch of British Columbia of which little authentic information was available and about which much was desired.



Hazelton (in 1899), at Head of Navigation on Skeena River, 180 Miles from Essington.

will serve to convey an intelligent idea of the nature and scope of this official account of the region visited and the journey through it:

INTRODUCTION.

Under instructions from the hon. the minister of

This report must necessarily partake largely of a description of the country along the route travelled or adjacent thereto, but, since the line of travel was "crossing the formations," both physical and geological, the features noted will, in all probability, be

found to extend a certain distance north and south of the section traversed.

The route taken on this trip was parallel to, but a little farther north than, that travelled over in 1905 across the Northern Interior Plateau, and the description of the major physical features contained in the report of 1905 are applicable to this more northerly route.

The party consisted of the provincial mineralogist, with Mr. Harold Nation as an assistant, and, for part of the time only, a cook.

A general description of the route taken is as follows:—From Victoria and Vancouver to Essington, at the mouth of the Skeena River, by Canadian Pacific Railway Company's steamer, a distance of 645 miles. From Essington up the Skeena River

which it was expected would have to be made on a raft, but, being so fortunate as to encounter an Indian with horses, a side trip was made to Moberly Lake and the Pine River district to the south, arriving at Fort St. John overland, after a trip by pack-train of some 90 miles.

From Fort St. John another trip by pack-train was made to the south, to the Pouce Coupe prairie, returning to Fort St. John after travelling by pack-train some 185 miles.

A short trip was also made from this point to the north, on foot, as no horses could be obtained on the north side of the river.

At Fort St. John a bateau was obtained from the Hudson Bay Company, and the party, here reduced to two, floated down stream to Peace River Cross-



Babine Village, and Outlet of Babine Lake, Looking South.

to Hazelton by Hudson Bay Company's steamer, a distance of 180 miles. From Hazelton to Babine Lake by pack-train, 70 miles. From Babine, up Babine Lake by canoe, across a portage of 12 miles to Stuart Lake by wagon road, and, again by canoe, down Stuart Lake to Fort St. James, at the outlet, a total distance of 150 miles. From Fort St. James to McLeod Lake by pack-train, a distance of 85 miles.

McLeod Lake is on the headwaters of the Peace River, and here canoes were taken to the head of the canyon of the Peace, a distance of 182 miles, where the canoes had to be abandoned and a portage of 14 miles made around the canyon to Hudson Hope, the party packing all its supplies and camp outfit across the portage.

From Hudson Hope to Fort St. John, on the Peace River, is a distance of 60 miles by the river,

ing, at the junction of the Smoky River with the Peace, a distance of 180 miles, crossing the Provincial Boundary into Alberta some 45 miles below Fort St. John.

From Peace River Crossing the party went by a freight wagon to the upper end of Lesser Slave Lake, a distance of 100 miles, travelling from that point in a Peterboro' canoe, kindly loaned by the Royal Northwest Mounted Police, down Lesser Slave Lake and River and the Athabasca River to Athabasca or bateau, 700 miles; by wagon, 200 miles; from which point to Edmonton is 100 miles by a good wagon road.

At Edmonton railway facilities were again obtainable and the party proceeded by the Canadian Pacific Railway to Victoria.

The distance travelled was estimated at, approximately, 3,120 miles, divided as follows:—By steamer,

910 miles: by pack train or on foot, 470 miles; by canoe or bateau, 700 miles; by wagon, 200 miles; and by railway, 840 miles.

The time occupied between transportation points, viz., Hazelton and Edmonton, was 77 days, includ-

direction 40 miles a day could be covered with little (about 10) expense. ~~about 10 miles a day could have been made, and three or four Indians would have been required to "track" the canoes up stream.~~



Stuart Lake, Looking West from St. James.



Stuart Lake, Looking East from St. James.

ing Sundays, in which time 58 camps, or ~~travels~~, were made. The route taken, while seemingly longer than necessary to reach and return from the district inspected, proved that "the longest way around is sometimes the shortest way home," as it was almost entirely down stream on the waterways, in which

A detailed description of the country passed through is given later on in this report, in diary form, but the following is a summary of the same:—

Mineral Possibilities.—The Babine range of mountains, over which the trail from Hazelton to

Babine leads, rises to heights of 7,000 ft. in the peaks, and its rock formation consists of schists, quartzites, shales, etc., cut by numerous porphyritic dykes. This range is practically the length of Ba-

same time, there have been a number of claims staked there, as yet quite undeveloped, which produce at least samples of copper, silver and gold ores that indicate possibilities and lead to the hope of greater



Fort McLeod—Hudson Bay Company's Post on McLeod Lake.



Mount Selwyn, on Peace River; Looking Southeast.

bine Lake, forming its southern shore and watershed, dying out both to the east and west of the lake. Prospecting the range has only been begun, and its potentialities are as yet undemonstrated; but, at the

things in the future.

On the north side of Babine Lake the country is so covered with recent superficial deposits, of Glacial age, that few exposures of solid formation occur to



BC Bureau of Mines

Valley of Peace River From Mount Selwyn, 4,000 ft Above River. Looking Northeast.

Mount Selwyn from rather more than half way up which this view was taken, rises to a height of 7,000 ft. and is handily the highest mountain in the Rocky mountain range by which the water from the great Interior Tributaries of British Columbia flows through and out from our Great Peace River and thence to the Arctic Ocean. About a dozen miles downstream from the foot of Mount Selwyn the Peace has a rapid, a 100 ft. up to 1,000 ft. deep. Rapid that does not speak for itself, where the about 100 ft. in height. These rapid mark the bottom line of the Rocky mountain range. Below them the Peace River is very narrow.

tempt the investigation of the prospector, particularly as the adjacent formations to the south have not as yet been proven.

To the south of Stuart Lake there is a range of rocky hills which does not attain to the dignity of being called a mountain range, in which there are exposures of solid formation, chiefly sedimentaries of Palaeozoic age, more or less disturbed, but which, as far as could be observed, have not been cut by the igneous dykes which elsewhere appear in some way to have been, if not the cause of, at least formed at the time when the mineralization took place, and which dykes form, to the prospector, the visible sign of a possible mineralization.

On the north side of Stuart Lake, until within a few miles of its eastern end, the country is covered with glacial deposits, and, from a mineral viewpoint, is unpromising, and from this district we have no record of even placer gold indications ever having been discovered.

Within a few miles of the eastern end of the lake a great knob of the underlying limestone protrudes, from which there are probably exposures of the same rock extending to the northwest, but this point was not investigated. The borders of this limestone area may prove worthy of investigation by the prospector, but the apparent absence of any serious igneous action is here also against the chances of its proving a profitable field. Such igneous action may be found to have occurred farther to the north and have as yet escaped notice, since the lake provides such an easy line of travel as to have left the adjacent country practically untravelled, save by the local Indians.

The line of the trail from Fort St. James to McLeod Lake is uninteresting in a mineral sense, as it is covered deep in gravel, clay, etc., and the few exposures of rock seen were mostly unpromising sedimentaries.

The course down the Paek and Parsnip Rivers was through similar country and lay at the base of the western foot-hills of the Rockies, a range which, as we know it in the more southerly part of the Province, where the geological formation and conditions are very similar, has not, as yet, proved productive of mineral wealth, although a few prospects have been located therein.

The Peace River, formed by the confluence of the Parsnip and Finlay Rivers, derives from the latter tributary wash from the northwest, from the vicinity of Manson Creek, a district in which placer gold has been already found in various localities and in considerable quantities. Consequently, as might be expected, the bed of the Peace River shows black sand and indications of placer gold throughout its explored length, some of the bars giving "colours" quite sufficient to offer inducements to prospect for dredging or steam-shovel ground, but, so far as is known, at no place have the bars contained a sufficient proportion of gold to be profitably worked by what has been called "individual" methods.

Unlike most of the streams in the southern part of the Province on which dredging has so far been attempted, the bars on the Peace River are found to

be free from boulders of any material size, a fact which should greatly favour dredging operations and render possible the working of a deposit of a grade which might not be profitable where such conditions did not exist. These remarks apply not only to the bed of the present river, but also, to a certain extent, to the banks of the river, which were at one time the bars in the greater valley of the ancient river into which the present river has cut. It was in banks of this description, some miles below Fort St. John, that small quantities of gold were found in 1905, which led to the staking of numerous claims and the rather sensational newspaper articles about them attributed to members of the Dominion Government Peace River Exploration party.

Coal.—So far as is known, there have been no indications of coal found in the section of country passed through between Hazelton and the head of the Peace River, although there is a possibility that lignite, at least, may be found under some of the glacial drift to the north of Babine and Stuart Lakes. It seems unlikely that the western slope and foot-hills of the Rockies will be found to be coal-bearing, as, at this latitude, the coal measures appear to be almost exclusively on the eastern slope of these mountains.

On passing down the Peace River through the main range the foot-hills are reached, where rocks of the coal-bearing formation are seen and continue to below the canyon, some 75 miles to the east, in which extensive region it is possible that, in the future, coal may be developed at many points.

Up to the present time the whole district to the east of the mountains has been under Government reserve, so that no coal or other land might be staked or recorded there, which fact has prevented the district from being prospected or settled. A few prospectors, either in ignorance or in disregard of the reserve, located and staked coal lands in the vicinity of the canyon, but as a record of these claims was refused by the Provincial Government, the prospectors and those interested are extremely reticent as to their finds, hoping to re-stake as soon as the reserve is opened, and it is felt that it is but right that the location of their discoveries be not made public.

The coal found appears to be a bituminous coal of very fair quality, in beds of workable thickness.

Some distance east of the canyon and south of the Peace River, on Coal Creek, a tributary of the South Pine, and on the headwaters of Muddy River and other streams of that vicinity, coal has been reported as found; the latest mention of such being by Mr. J. A. Macdonnell, in the report of his explorations of the district for the Dominion Government, in which he mentions finding a good bituminous coal.

The writer, who followed his trail through the district for a considerable distance, found lignite, but was unable to see any bituminous coal, which, it is expected, would be found to be confined to the district more closely bordering on the main mountain range. It is thought that, as soon as railway transportation through the district becomes an established fact, a number of workable deposits of coal will be developed, but under the present conditions any such

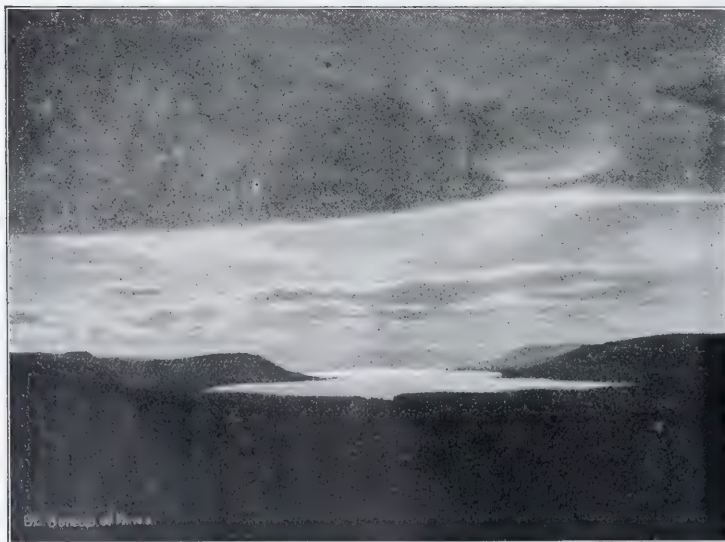
deposit would be without value.

Timber.—Of timber, such as is called timber on the Coast, there is none in the district travelled

with numerous knots, etc. Timber line in the interior, at this latitude, may be placed at, approximately, 4,000 ft. above sea level, although a few scrub



Packing Over Mountain-of-Rocks Portage, Peace River.



Moberly Lake; From the East.

through. Such timber as there is, is spruce, hemlock, balsam and jack pine, the best of it ranging from 12 to 24 in. in diameter, and not tall for that diameter,

trees and bushes range higher. Timber which would be even locally merchantable for lumber is scarce, the repeated forest fires having thoroughly cleared



Port St. John—Hindson Bay Company's Post on Peace River.

Port St. John lies on the north bank of the Peace River, on a small area of comparatively level land at the foot of the steep-sided, barren mountains that border to the general plateau level. There has been located here for more than 20 years a Hindson Bay Company's post, and in its early years these traders have established a trading post, which latter has, within the last two years, been taken over by the Revillon Frères, and has been a great success. Port St. John is the chief point in the Peace River country, and the only settlement. It is also the upper terminus of a wagon road which, together with water routes, carries through Port St. John, Alberta.

out the greater portion of it, leaving only a few isolated patches of the older trees, while the subsequent growth has not as yet reached a size to make it of value for this purpose. Of these patches, probably the best is to the south of Babine Lake, towards its southeastern end, where there is a very fair body of spruce timber. There is a very limited area of fir on Stuart Lake, near the portage, and a few isolated patches of spruce at intervals along the south shore of the lake. There is an area of very fair spruce to the east of McLeod Lake, but along the Parsnip River there is no timber fit for lumber, with the exception of isolated spruce trees and large cottonwoods, which may be utilized and now serve for making the dugout canoes used in the district. These latter trees grow plentifully and sometimes very

On the south shore of Babine Lake, near its outlet, there is a small area of good land, but the remainder of this south shore did not appear promising, good land only being found around the mouths of the few creeks. On the north shore of the lake there is a quantity of very good land. There is a strip of this land extending almost continuously from the outlet up the lake for some 40 miles, and extending from the shore at least a mile back. The greater part of this area is open, free from trees, clear, and supports a magnificent crop of wild hay, which in July was being mowed by the Indians for winter horse and cattle feed, the stock in summer finding good grazing on the higher land, further back from the lake. This was one of the finest strips of land seen on the trip. The soil is a clayey loam;



Hudson Bay Company's Post at Dunvegan, Peace River, Alberta.—Looking Down Stream.

large on the river bottoms of the streams of the northern watershed.

To the east of the mountains, on the upper benches, there is little or no timber, as a rule, the whole country having been burned over. There are, however, on the trail to the Pouce Coupe, a couple of small areas which escaped the general conflagration and are correspondingly the more valuable.

A few tamarack (*Larix Americana*) trees were seen east of the mountains, but that such do not grow west of the mountains here may be inferred by the fact that the Indians from Stuart Lake had never seen and did not know the tree.

Agricultural Lands—In the district passed through there are, to the west of the Rockies, no large blocks of land suitable for agriculture or even grazing, although there are a number of strips of such land, some of them of considerable area.

the slope from the lake is gradual, with a southern exposure, and would support grain of all sorts, as well as vegetables.

The district is at present remote from transportation, but the lake is eminently suited for navigation, with a low valley opening from its southeastern end towards Fraser Lake, through which a road could be easily built, and it seems probable that connection will thus be made with the main line of the Grand Trunk Pacific Railway, soon after that road is built.

In this valley just mentioned there is good agricultural land extending up the valley for miles, but not exceeding in width one or two miles.

To the south of both Babine and Stuart Lakes the hills rise from the water's edge, and, except in a few instances around the mouths of creeks, there is no land suitable for agriculture. At the east end of Stuart Lake there is a considerable area of fine land

to the southeast, which was fully described in the report of 1905.

The trail from Stuart Lake to McLeod Lake passes along the height of land separating three drainage areas, and the greater part of the land in this section consists of gravel benches, barely supporting a scanty growth of jack pine. There are, however, a few patches of land in bottoms which is fair, and a few good hay meadows, but these are too isolated to be of any general importance. These conditions prevail all the way down the Pack and Parsnip Rivers to the Peace River.

In passing down the Peace River, the mountains occupy the land for some distance, followed by the foot-hills as far as the canyon, and it does not seem to offer any inducement to the agriculturist. Possibly, when the country is more developed, a few valleys in the foothills, of very limited area, may eventually prove of use.

From the canyon east to the boundary of the Province a considerable proportion of this great area, as far as the soil, etc., is concerned, is quite suitable for cultivation, being rolling prairie bench land, some 800 to 1,000 ft. higher than the Peace River, and requiring little or no clearing, such tree growth as there is being small poplar and willow. The stream courses are cut down into this bench land to such an extent as to preclude all possibility of irrigation for the greater part of the district, but from observation in a dry season and from information picked up, it would seem that the summer rainfall and dews are quite sufficient for ordinary crops, while the streams and numerous small lakes provide all the water needed for stock.

Of this large area of land, which will some day be utilized for farming, the choicest parts seen were at the Pouce Coupe prairie and around the ends of Moberly Lake, the former about 40 miles long by 25 miles wide, a solid block of fine rolling prairie, clear of trees and covered with grass suitable for hay, well watered and with splendid soil, the analysis of which is given in the detailed report. This is probably the largest solid block of farming land in British Columbia. Detailed descriptions of the land along the route are given elsewhere in this report.

Agricultural Possibilities.—In the whole of the district passed through there are no settlers or settlements, except the isolated posts of the Hudson Bay Company, which are primarily fur-trading posts. Cultivation of the soil being a question of inclination of the factor, there have been few attempts at cultivation from which to draw definite conclusions as to the agricultural possibilities of the region. At Babine Post the ordinary root crops and summer vegetables are grown without difficulty, although occasionally summer frosts trouble the potatoes. Hay and other wild grasses grow so prolifically that it is considered there would be no difficulty experienced with barley, rye, oats, wheat, etc. The summers are reported to be warmer than at Stuart Lake, with a greater summer rainfall and heavier snowfall, together with a winter season averaging two weeks

longer than at Stuart Lake, and probably a lower winter temperature. At Stuart Lake, as stated in last year's report, all the garden vegetables and root crops have been grown successfully, as have the small fruits, such as apples, plums, strawberries, etc., tested at the Hudson Bay Company's post up at the Roman Catholic Mission, a mile further up the lake, at which latter point barley, rye and oats were seen growing and almost ripe, with fine full heads.

Owing to the difficulty in getting young trees into the district, no attempt has been made to grow fruits, such as apples, plums, etc., but it is not expected that there will be any difficulty in growing these fruit trees. The climate compares very favourably with that of the Province of Quebec, with which the writer is familiar, where fruit is grown equal in flavour to any produced in the Dominion.

At McLeod Lake summer vegetables and root crops have, for many years, been grown with success by the Hudson Bay factor, although the soil around the post is poor and requires artificial irrigation. The crop of wild hay here, where the soil was suitable, was good, and the berry crop plentiful and of good quality.

There is no permanent habitation on the Peace River between the Rocky Mountains and Fort St. John. East of the mountains the vegetation was found to be luxuriant, and seemed to indicate a favourable climate. The wild berries were as good as anywhere in the Province, although not as plentiful. The size of the "apples" on the wild rose bushes was particularly noted, as being larger than seen anywhere else in British Columbia.

At Fort St. John the Hudson Bay Company's factor grows vegetables, etc., but has never attempted anything further. In 1906 the potato crop at the post was poor, owing to the unusual dryness of the season.

South of Fort St. John, in the Pouce Coupe district, no cultivation has been attempted, but the growth of wild grasses and the general conditions seem to compare favourably with portions of Alberta seen later, and which successfully supported a fine crop of grain.

Around Dunvegan, on the Peace River, in Alberta, vegetables and grain of the usual sorts are grown on the lower benches, but it is reported that attempts to cultivate the higher bench lands, some 600 to 800 ft. higher than the river, have not been successful.

At Peace River Crossing, at the junction of the Smoky River with the Peace, the usual garden vegetables were seen growing in the latter part of September, while melons were reported to have been grown nearby, although these were not seen, but the writer ate ripe tomatoes, grown outside by Mrs. Anderson, whose husband, Sergeant Anderson, is in charge of the Royal Northwest Mounted Police barracks.

This point is more northerly than any part of the Peace River in British Columbia, and the climate is colder, yet at Vermilion, some 300 miles still farther to the north and down the Peace River, grain

is reported to be grown to an extent to justify the existence of the three flour mills in operation there.

Climate.—It might be well to quote from Professor Macoun, botanist of the Geological Survey, who visited this district in 1872 and 1875. Speaking of the district in the vicinity of Stuart Lake, he says:

"There can be no doubt but that when the forest is cleared, by whatever cause, the soil will become drier, and the climate will be considerably ameliorated. Owing to the latitude, the sun's rays fall obliquely on the forest, and as a natural result there is little evaporation. As Germany was to the Romans, so is much of our Northwest to us—a land of marsh and swamp and rigorous winter. Germany has been cleared of her forest and is now one of the finest and most progressive of European countries. May not the clearing of our northwestern forests produce a similar result in the distant future of British America."

In the garden of the Hudson Bay Company's post at McLeod Lake, he found in June, 1875, "among other vegetables, cabbage, cauliflower, turnips, peas and potatoes—the latter 6 in. high—growing luxuriantly and not at all injured by frost, although it had been very severe one night shortly before our arrival."

He writes of the vicinity of Hudson Hope:—"I have been extremely surprised at the rankness of the vegetation around here, although there is very little rain at this season and there has been little all spring. Wild peas and vetches grow to an amazing height in the poplar woods, and form almost impenetrable thickets in many places. Vetches, roses, willow herb (fireweed) and grasses of the genera *poa*, *triticum* (bunch grass) and *bromus* fill the woods and cover the burnt ground, and surprise Canadians by their rankness and almost tropical luxuriance. * * *

"Growth is extremely rapid, owing partly to the length of day and cloudless skies, supplemented by heavy dews, and possibly also the great range of temperature during the twenty-four hours, from 45 deg. at sunrise to 80 deg. F. at noon.

"At St. John (on the Peace River) a few minutes' observation tended to show that this point was much warmer than Hudson Hope, that the soil was richer and that the vegetation was in a far more advanced state. Raspberries and service berries were fully ripe and in great abundance. Potatoes, oats, barley, and many varieties of vegetables were in a very flourishing state in 'Nigger Dan's' garden. The oats stood full 5 ft. high, and the barley had made nearly equal growth.

"I started up the hill in rear of the fort. We found the level of the country above the river valley to be about 700 ft. * * *

"Clumps of willows and poplars, of various ages, were interspersed with the most astonishing growth of herbaceous plants I ever witnessed.

"Willow herb (fireweed), cow parsnip, *geum*, *triticum* (bunch grass), *poa*, and a number of other tall-growing species, covered the whole region with a thick mass of vegetation that averaged from 3 to 5 ft.

"The soil must be exceedingly rich to support such

a growth year after year.

"My observations all tend to show that, omitting the slopes on the left bank, the flora of this region is almost identical with that of Ontario.

"It would be folly to attempt to depict the appearance of the country, as it was so much beyond what I ever saw before that I dare hardly make use of truthful words to portray it.

"The country passed over in your own (Selwyn's) excursion, 10 miles to the northwest, you report to bear a vegetation similarly luxuriant, more so than about Edmonton, or anywhere in the Saskatchewan country. Rainy River and the Lesser Slave Lake marshes are the only regions known to me that are in any way comparable to it.

"The latter, however, is swamp, while this is a plateau, nearly level, and in parts over 700 ft. above the river."

Dr. G. M. Dawson, in the "Geological Survey Report" of 1879, writes of this district as follows:—

"Climate and Agriculture.—With regard to the climate of the Peace River country, we are without such accurate information as might be obtained from a careful meteorological record, embracing even a single year, and its character can, at present, be ascertained merely from notes and observations of a general character, and the appearance of the natural vegetation.

"It may be stated at once that the ascertained facts leave no doubt on the subject of the sufficient length and warmth of the season to ripen wheat, oats and barley, with all the ordinary root crops and vegetables, the only point which may admit of question being to what extent the occurrence of early frosts may interfere with growth. This remark is intended to apply to the whole district previously defined, including both the river valleys and the plateau.

"Wintering Stock.—Horses almost invariably winter out well, without requiring to be fed. Hay should be provided for cattle, to ensure perfect safety, for a period of three or four months, though in some seasons it is necessary to feed the animals for a few weeks only. The Indians of the Cree settlement on Sturgeon Lake winter their horses without any difficulty around the borders of a neighbouring lake, the shores of which are partly open. From Hudson Hope the horses are sent southward to Moberly Lake to winter, and, according to Mr. Selwyn, do well there. Lesser Slave Lake, with its wonderful natural meadows, has long been known as an excellent place for wintering stock, and is referred to as such by Sir J. Richardson."

A comparison of the totals of 1899 and 1906, respectively, shows that the mineral production of British Columbia has doubled in value in eight years.

The Geological Survey of Canada has estimated the production of copper in Canada for 1906, at 57,029,231 lb., valued at \$10,994,095. Of this production 79 per cent. was contributed by British Columbia.

HUDSON HOPE ON PEACE RIVER.

From Report of Provincial Mineralogist.

HUDSON HOPE may be taken as marking the eastern boundary of the foothills of the Rocky Mountains, as to the east the country spreads out into high-level bench prairie land, having a gen-

fine, dark, loamy soil, resting on a bluish clay, underneath which, as seen in the cutbanks along the rivers, lie clay shales with beds of semi-coherent sandstone, all belonging to the Cretaceous period. Interbedded with these measures there are, probably, occasional beds of lignite, and possibly of true coal. The "float" from these seams was found in various creeks, but the beds in place could not be found, a matter not



Hudson Bay Company's Post at Hudson Hope, Peace River.



Looking East Down Peace River from Hudson Hope.

eral height above sea level of from 2,200 to 2,400 ft., into which the Peace River has cut to a depth of about 800 to 1,000 ft., while the smaller waterways have cut to a correspondingly less degree.

Almost everywhere the surface, for a depth varying from one to four or five feet, is composed of a

to be wondered at, as every cutbank seems to have a fresh mudslide each spring.

The Peace River, below Hudson Hope, has a width of from a quarter to half a mile, and, although flowing at the average velocity of from five to six miles an hour, contains no rapids, as its bed is com-

posed of gravel and small, round, water-worn stones, producing innumerable bars and shoals, with numerous islands, almost every one of which bears evidence of having been originally a gravel bar, on which, at the upper end, a log jam had formed, producing a breakwater behind which the sand and silt had collected, forming a foothold for the vegetation of forest trees which now grow so luxuriantly.

In the back channels and eddies sand and silt bars have collected, and these, particularly nearer the Canyon, show colours of fine gold. Attempts have been made to wash these bars with cradles and sluices, but, while some quantity of gold has been recovered, the bars are not rich enough to pay for this class of mining. The results obtained, however, indicate the possibility of their being successfully worked by dredging, the character of the river bed, its freedom from all boulders, etc., being particularly suited for such operations, although, at the present time, the difficulties of transporting heavy machinery into so remote a district seem almost insurmountable.

At highest water the river is too swift, and at low water too shallow, for steamboat navigation, but, for a period during midsummer, the Hudson Bay Company operates a large and well equipped stern-wheel steamer from Vermilion to Peace River Crossing, at the junction of the Smoky River, a distance of some 300 miles, with each year occasional trips to Fort St. John. In 1906 the steamer ran one trip to Hudson Hope, a distance of 250 miles above the Crossing, thus providing transportation over a distance of 550 miles of river; a length of river navigation which can best be appreciated by stating that it is approximately 50 per cent. greater than that provided by the St. Lawrence River, from the Great Lakes to Quebec, on tide water. According to the Geological Survey, the fall in the river between Hudson Hope and Vermilion is 572 ft. or about one foot to the mile.

THE SURFACE GEOLOGY OF BRITISH COLUMBIA.

DR. R. CHALMERS of the Geological Survey of Canada, spent the closing weeks of last year's field-work season in examining the surface geology of British Columbia. In his report on the "Surface Geology of the Great Plains and British Columbia, etc.,"* he gave the following information concerning this Province:

"The surface deposits of British Columbia are somewhat different from those of the great plains. The black clay or vegetable deposit is not often seen there, the materials consisting largely of gravels, sands, silts and clays. The heavier precipitation and the extensive denudation which the western slope of

the Cordillera has undergone carried away much of the eroded material. Except in the river flats, which are comparatively narrow until the Pacific Coast is approached, the level surfaces are few and limited. The valley of the Fraser River, however, exhibits some fine terraces and meadows in its lower reaches, and where these are overflowed by spring floods periodically there is a black loamy soil. These remarks apply more particularly to the mainland; but the surface deposits of Vancouver Island, so far as examined, appear to be very much the same.

"Clays are common in the prairies and British Columbia, and bricks are manufactured at or near all the principal towns. The clays of the plains, however, contain lime, as they are largely derived from the shales, limestones and other rocks of the prairie and Rocky Mountains. Iron and other substances, as for example soda, potash, magnesia, etc., are also found in them and are more or less detrimental to clays intended to be used for refractory products such as firebrick, pottery, etc.

"Though ordinary brick clays are so widely distributed over the prairies they are quite thin in many places, and vary in character and composition.

"In British Columbia bricks are made in several places, especially at or near the towns. Pressed brick, firebrick and sewer pipes are manufactured at Victoria, Fraser River and other places. Good fireclays occur at Ladysmith and Comox, and on the mainland at Matsqui on the west side of Fraser River.

"A highly plastic ferruginous clay,, which might be used as a pigment, occurs on Texada Island.

"From the north arm of Burrard Inlet a good brick clay has been obtained.

"A fairly refractory firebrick could be made from an under-clay which occurs in Granite Creek, Yale district, and in the Kamloops division of the same district another deposit of good clay is found up Guichon creek.

"Clays of economic value have also been noted on Michel Creek, East Kootenay, and on Arrow Lake, West Kootenay.

"In British Columbia the soil is different from that of the prairies. Clays, sands, silts and gravels prevail everywhere, however, and the central part of the Province has been found a good fruit-growing district."

(Note—Dr. Chalmers appears to have been inadequately informed as to the "good fruit-growing" parts of British Columbia. Not only the central part, but practically wherever fruit trees have been planted—along the valleys of the rivers in East and West Kootenay, and Yale; in the valleys of the rivers and on the delta of the Fraser; on Vancouver Island, and in other parts of the Province, it has been amply demonstrated that fruit-growing can without difficulty be made a successful industry.—*Editor MINING RECORD.*)

*In "Summary Report of the Geological Survey Department of Canada for 1906," pp. 78-79.

CARIBOO DISTRICT.

A Year's Progress in Placer Gold Mining.

CARIBOO AND QUESNEL mining divisions of the Cariboo district together produced in 1906 placer gold to the value of \$395,400 as compared with \$753,000 for all other parts of British Columbia. These figures are from the official records, which credit Cariboo division with a total recovery last year valued at \$355,800 and Quesnel at \$39,600. It may be that after the Guggenheim properties near Bullion shall be supplied with ample water for gravel-washing purposes the Quesnel division will show an annual production of gold as large as that of the Cariboo, as was the case in the nineties. In fact its output during six years 1895-1900 considerably exceeded that of the parts of the district now included in the Cariboo division, having reached an aggregate in that period of \$1,457,710 as against \$953,400 for the latter. Quesnel's most productive year was in 1900 with a total recovery for that year of \$510,000; since then its output has decreased year by year until in 1906 it got down to what it is believed will prove to have been its extreme low-water mark. Cariboo division, on the contrary, has in late years made a substantial increase, last year's total having been its highest since the early nineties, while its aggregate of \$1,623,200 for five years, 1902-1906, compares very favourably with that of \$906,100 for the corresponding period, 1897-1901.

The following reports for 1906* of George Walker, gold commissioner for the Cariboo district, and the mining recorder of Quesnel mining division, respectively, give information showing the condition of the placer gold mining industry in the district last year: Mr. Walker reported:

"I am unable to announce any increase in the gold output of the mines, but, at the same time, the actual conditions give the greatest encouragement that the district is on the eve of a prosperous term that has not been equalled for years, from the fact that more applications for mining leases have been granted than in any previous year, while there has also been an increase in the revenue. The work done during the past year has given evidence of such a substantial character that it is safe to predict greatly increased activity in the near future. Several of the small properties, hitherto held and worked by individual miners, have been purchased by strong companies and formed into large enterprises, necessitating the construction of extensive ditches, flumes, reservoirs and other works of a substantial nature. This changing of the methods of working, together with the very dry season, has had a deterrent effect upon the output of our hydraulic operations, the method by which three-fourths of the gold of the district is produced, and has curtailed this year's output of gold, but, when the extensive preliminary works already well under way are completed, there will undoubtedly be a large

increase in the gold yield of the district.

"In order to obtain as reliable information as possible, I addressed notes to the foremen and managers of the Cariboo mines, requesting a report on the season's operations at the mines under their supervision, and from the information thus obtained the following report is largely taken:

"CARIBOO MINING DIVISION.

"In the Cariboo, or what is locally known as the Barkerville mining division of Cariboo district, the result of the season's operations has been fairly good, but shows a slight decrease from that of the previous year.

WILLIAMS CREEK AND CHIEF CLAIMS.

"The Mucho Oro claim on Stout's Gulch, formerly owned by W. C. Fry and purchased this year by John Hopp, who, having leased the Cariboo Gold Fields ditch and installed a larger hydraulic plant, moved approximately eight times as much material as was previously done by the former owners. The output of the mine, so far as I can learn, has been very satisfactory and the future prospects are promising.

"The Forest Rose hydraulic claim, on Williams Creek, also owned by Mr. Hopp, on which very little had been done for a number of years, has been put into good working order and active operations will commence in the early spring.

LOWVILLE CREEK.

"The property on this creek formerly owned by the Cariboo Consolidated, Limited, and on which very little has been done for the past three or four years, was also purchased by Mr. Hopp, who in the fall employed quite a force of men repairing ditches, enlarging the sluice flume and making general repairs in and around the property so as to be in readiness for next season's work, when, I am informed, it will be operated to its full capacity.

LIGHTNING CREEK AND TRIMBLE CLAIMS.

"I am indebted to the manager of the Cariboo Consolidated (1904), Limited, Melbourne Bailey, for the following brief but comprehensive report on the La Fontaine mine:—

"Work has progressed steadily, with a force of men numbering on an average 48 per diem for the whole year. The total length of the various tunnels, drives, cross-cuts, etc., that have been driven to date, in developing and prospecting the channel, is 6,340 ft. A total of 95.2 ft. of upraises has been made, in addition to the main shaft, which is of a depth of 175 ft. Since the first of January, 1906, a total of 6,828 cu. yd. of gravel has been mined and washed, which yielded 1,451.5 oz. of gold; the gravel having, therefore, an average value of \$3.91, as against last year's average of \$2.22 per cu. yd. The total amount of gold recovered to date in our La Fontaine mine is 2,035 oz., having an approximate value of \$37,450. Our drainage drives are being continued up stream as rapidly as possible, in order to block out and drain the gravel so that it can be worked to advantage later on.

*See "Annual Report of Minister of Mines for 1907" pp. 1138-1147.

"Above the Old Eleven of England workings, opposite the mouth of Anderson Creek, gravel containing very much higher values has been struck, some of this gravel averaging \$30.40 per cu. yd., making the outlook for the future very bright."

This determined the depth and location of the old channel of Lightning Creek, at the present location of our works, to our satisfaction. A year ago we began the preliminary work and placed orders for the equipment of our shaft; since then we have sunk



Old Black Jack and Burns Hydraulic Placer Gold Mine, Cariboo, B.C., in 1863. Reproduced for the British Columbia Bureau of Mines from an old Photograph in Possession of Hon. D. M. Elerts, M.P.P., Victoria, B. C.

"I am indebted to S. Keast, Superintendent of the Lightning Creek Gold Gravel and Drainage Company, Ltd., for the following report:

"Our previous report included mention of prospect drilling operations closing the season of 1905.

a double compartment shaft 8 ft. 6 in. x 12 ft. 6 in., about 200 ft. deep, and at this writing the cross-cut, 8x12 ft., is in about 90 ft. and, we believe, very close to gravel. We have equipped the plant with a 40-h.p. engine, 10-h.p. dynamo engine, 12-h.p. com-

pressor, two 40-h.p. boilers, 25-h.p. hoist, saw-mill, two 12 in. Cornish pumps, driven by a water-wheel 8 ft. breast and 20 ft. diameter, a Keystone drilling apparatus to locate the depth, values and position of the old channel, a considerable amount of special machinery, including a power lathe, large pipe-cutter and threader, boring machine, and a complete outfit of tools to suit our work. We also have one large and one small steam pump, with special arrangements for fire protection. The property is also well provided with buildings for various purposes. The main shaft-house is 62x90 ft. The old shaft house is equipped with an 8-in. pump and water-wheel, and besides this we have two 6-in. fast-speed pumps for general use. Estimates on a 500-h.p. electric plant, to be driven by turbines (water power), have been obtained from various companies, it being our intention to run all the works by electric power, the station to be located below the old Big Bonanza dam, which we have cut away preparatory to the erection of a much larger dam on the same site. All our operations along the creek will be connected by a narrow gauge electric railway.

"The installation of this plant, which we estimate will cost \$60,000, will greatly reduce operating expenses and enable us to operate on a much larger scale. Since the last active work began, in May, 1905, the company has expended for labour, equipment and working expenses, generally, an average of \$5,000 monthly. At present there are about 30 men directly connected with the work, which number will be increased as soon as we get working room in the drifts, if efficient labour can be secured.

"During the past winter our holdings, including the Big Bonanza and other claims not included in the previous Consolidation Act, were re-consolidated by an Act of the Provincial Legislature.

"The supplies and equipment for drilling operations and for special work during the ensuing season have been ordered. These will aggregate fully 25 tons of material, excluding the proposed electric plant. A second shaft will be started in the spring, and after drilling the Big Bonanza a 300-ft. shaft will be started thereon. The steam equipment for the No. 2 shaft is now on the ground.

"The drilling operations at our present location showed 9 ft. of old or pre-glacial channel gravel, very firm and apparently rich, underlying all the other gravel and sand. The formation is about as follows: 40 ft. sand and gravel, 40 ft. blue clay, 30 ft. dry and wet slum, 45 ft. sand and gravel, 10 ft. old hard gravel; altogether, 165 ft.

"The 6-in. drill hole which penetrated the old channel at this depth gave values of \$7.15, recovered by the sand pump. This would figure over \$1,000 to the set, if these values were similar over the bedrock at this location.

"During the past summer seven holes were drilled about half a mile above our present shaft, and the last one, we feel certain, would have located the old channel, but that at 146 ft. the drive pipe parted, and not having enough for a new string, we closed that work until spring. At this depth, however, we

recovered \$2.50 with the sand pump. The gravel at this point was quite thick, and from the upper indications of value the bedrock was expected to show a larger value than the location below.

"Of the Fountain Creek Consolidated Mining Company, of Fountain Creek, an enterprise started last year to prospect the deep ground of this creek, A. McPherson, the foreman, writes me:

"The Fountain Creek Consolidated Mining Company was first organized in July, 1905, to prospect on Fountain Creek. After four months' work the venture was found too expensive for the company. The first bedrock was found at 45 ft., from which some 50 ft. of drift was run, but the bedrock found in the channel had so heavy a grade and was washed so smooth that very little value was obtained, but the quality of gold was so encouraging that the company concluded to go half a mile further down stream and sink a second shaft. This was done, but a depth of only 42 ft. was obtained when a flow of water was struck; after three days' work bailing with a bucket and windlass the shaft had to be abandoned and work was suspended for two months and the company was reorganized. The reorganized company, on November 20, 1905, started to work to find the channel by sinking a large shaft, building an overshot water-wheel to drive pumps and a large shaft-house, all of which are completed. The shaft was sunk 52 ft. and a drift started in rock to find the channel. This drift is now out from the shaft 55 ft., but, as the rock encountered is very hard, the progress made is slow. Up to the present time the company has expended \$10,000."

"Bertram Mellon, manager of the Slough Creek, Ltd., kindly furnishes me with the following particulars of the company's operations:

"Our operations for the current year consist of drifting in bedrock and tapping the gravel at various points at intervals during the year, but only as much work of this nature has been done as was necessary to maintain a flow of water from the gravel at a speed sufficient to keep both pumps running at from 70 to 80 per cent. of their capacity. The greater part of the year has been occupied with purely construction work. A water lodgment (having a capacity of about 60,000 Imperial gal.), has been driven below the level of the main tunnel for a distance of 140 ft. A drift is now being run from the main tunnel to connect with the pump chamber and provide a necessary exit. The old drain tunnel, commencing some 2,000 ft. down the valley and connecting with the gravel shaft, has been opened up and repaired throughout. This drift is now being continued up stream, for the purpose of taking off the surface water and so reducing the possibility of this water finding its way to the bedrock gravels. Pumping, at the rate of from 7,000,000 to 8,000,000 gal. a week, has gone on steadily throughout the year. It is now quite clear that the unwatering of this mine is a much greater undertaking than was anticipated, and in order to increase the outflow and assist the pumps it is proposed to elevate water with bailing tanks. Two additional boilers and a pair of 16 in.

x 36 in. direct-acting winding engines will be installed. The work attending this increase of plant, new boiler house, an extension of shaft-house, and a new head frame, etc., is now going forward. From 20 to 30 men have been employed and about 60 Chinese are at work cutting fuel, under contract.'

WILLOW RIVER.

'The Willow River Mining Company, Limited, has at last succeeded in reaching the deep channel of Willow River, and, I am credibly informed, when compelled to shut down on account of the fatal illness of the principal owner, was working on gold sufficient to pay, with the ground improving with every foot advanced across the channel.

MOSQUITO CREEK.

'The Williams and Alabama hydraulic claims, owned by Flynn Brothers, owing to the light snow-fall of last winter, had a short season; notwithstanding this fact, these claims still continue to be among the most productive of the district.

EIGHT-MILE LAKE.

'T. O. Burgess, assistant manager of the Thistle Gold Company, Ltd., says:—'Notwithstanding the fact that it was necessary to do considerable dead work before obtaining any returns from the mine, the season just past has proved a very successful one. This is due in great part to the unusual rainfall in the latter part of the season, there having been after the first day of September, 26 days (24 hours each) of water for hydraulic operations. From the commencement of the season to June 30, there were 52 full days of water. In order to gain depth, a cut for a sluice flume 2 ft. in width was brought up from the lake through the east side of the diggings. As the old sluice flume was on the west side, this also afforded better dumping facilities, that part of the lake into which the old sluice dumped having been filled up with tailings. With the exception of occasional bedrock, the cut was in hardpan, all of which it was necessary to blast before the pipes would take hold. This cut, 800 ft. in length, had a minimum depth of 8 ft. a maximum of 30 ft. and an approximate width of 8 ft.; total length of new sluice-flume laid, 1,200 ft.; grade of sluice, 4 in. to the 12-ft. box.

'While the above-mentioned work was in progress the top material at the working face, which, in the fall of 1905, was prepared for washing by a bank blast, was worked off through the old sluice-flume. The bottom or pay-gravel was left until the fall run, when it was taken up and washed through the new sluice. At the same time a small pit was also taken out on the west side of the diggings. Another bank blast will be put off this fall; length of main drive 60 ft.; length of T, 60 ft.; charge, 3,000 lb. of black blasting powder.

'Fifteen men were employed in the early part of the season. The prospects for next season are bright, the ground is good, and all work will be live work.'

GROUSE CREEK.

'Regarding the Waverly mine, P. Carey, the foreman, says:

'With a light snowfall during the winter, it was the general opinion that the water supply would be short, which proved well founded. After a short run with the best of the freshet, I decided to store the remaining flow in the reservoir, and thus keep the mine going steadily with the usual number of hands. The result of the clean-up was so satisfactory that the board of directors was able to declare a dividend of \$5 per share, an increase of \$1 per share over any previous year. Then the necessity of having to divert water from the main pipe-line for the economical and convenient working of the west branch pit, a new giant, water gates and other apparatus had to be provided for as well. A contract has been let for the supplying and delivering of this material at the mine, to be in readiness for next spring's operations. In conclusion I may add that, from present appearances, the large body of pay-gravel in the faces of both pits of the mine will be a steady and increasing dividend-producer for years.'

CHINA CREEK.

'I am favoured with the following report from B. A. Laselle, manager of the China Creek Hydraulic Company:

'An early spring made it possible to commence hydraulicking the last week of April, 10 days earlier than usual. The total yardage washed during the season was 150,000 cu. yd., of which 60,000 yd. were piped off during the fall run and not cleaned up. The equipment on this property now has an average daily washing capacity of 2,000 cu. yd. a day of 24 hours. The gold values continued uniform, and the large amount of workable ground in this company's holdings makes the future of this mine appear satisfactory to the owners.'

NUGGET GULCH.

'There is a new hydraulic mine of much promise on Nugget Gulch, which has been equipped this season, and of which the manager, B. A. Laselle, says:—

'This property has been equipped during the past season with a complete hydraulic plant, capable of handling 1,500 cu. yd. a day of 24 hours. The water supply is secured from Victoria Creek, where an earth-filled crib dam was constructed for storage and reservoir purposes, which will enable the property to be worked a part of the time during the dry seasons. The water was turned into the pipe for a few days in the latter part of October, and the pit opened up enough to enable this mine to start hydraulicking with the first water available in the spring of 1907. Construction work on the property completed this season consists of 2½ miles of ditch, with a carrying capacity of 1,200 miner's inches; an earth-filled crib dam 250 ft. long, 14 ft. high, and 34 ft. wide on the bottom; pipe-line, 1,250 ft. long; sluice-flume, 200 ft. long; camp buildings and three miles of new wagon road up Antler Creek. This property is situated on what is apparently a pre-glacial channel coming in from the head of Cunningham Creek, with every appearance of having been the principal source of the gold found on Antler Creek during the early sixties, and the owners feel assured of profitable re-

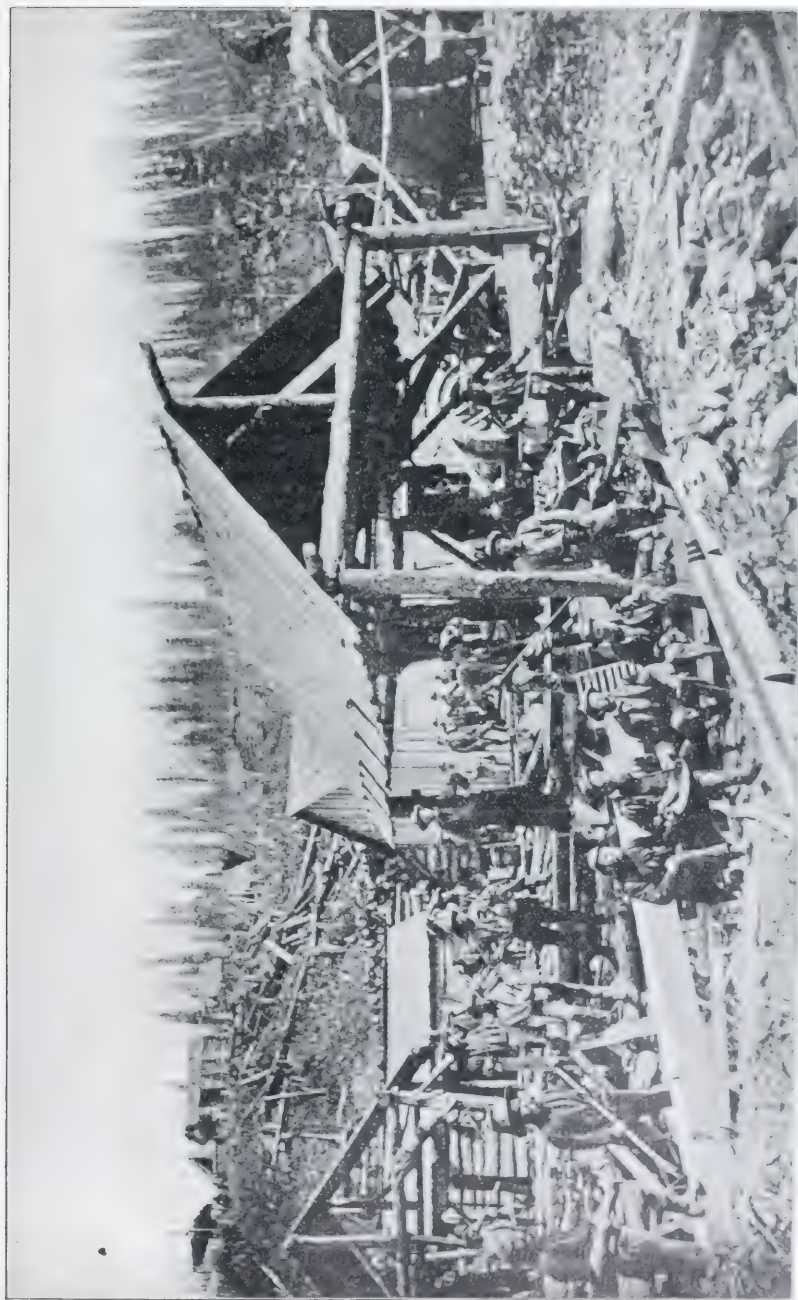


Fig. 1. A. J. Cameron's Plan of Gold Claim on Williams Creek, Colorado, 1893. Reproduced for the British Columbia
Department of Mines from the 10th Anniversary of the Publication of the Transactions of the Geological Survey of Canada, B.C.

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turns from this property in the future, as the workable ground is extensive and well suited for cheap and economic working.'

ANTLER CREEK.

"The Russian Creek hydraulic mine, on Lower Antler Creek, is a new hydraulic mine of much promise, which is being opened up, and of which the superintendent writes me as follows:

"The Russian Creek mine is situated at the junction of Russian and Antler Creeks, having a bench more than a mile in length, and ranging from 500 to 1,000 ft. in width. Gold was first discovered late in the season of 1905 by a shaft sunk to a depth of 35 ft. Later, seven shafts were sunk, cross-cutting the bench, ranging from 20 to 30 ft. in depth, all showing high gold values, which increased with depth, although it was impossible to reach bedrock in any one of the shafts on account of water. During the present season two men have been employed ground-sluicing a cut, which cross-cuts the bench, in order to determine the average value of a cubic yard. There was, approximately, 900 yd. of gravel moved, producing $12\frac{1}{4}$ oz. of gold, which was an average of about 25 cents a cu. yd. The face of the present cut is about 38 ft. high, with the bedrock pitching into the hill; therefore, it is impossible to determine the depth of the deep ground at present. The company intends to install a hydraulic plant for next season; at present there are four men at work digging a ditch to be about a mile long, 3 ft. wide in the bottom by 5 ft. on top, for the purpose of bringing water from Russian Creek on to the ground.'

CUNNINGHAM CREEK.

"The Bear Hydraulic Company, Ltd., on Cunningham Creek, which owns the second largest hydraulic mine in Cariboo district, has completed a large dam on Cunningham pass for storage purposes, which will enable the management to work the mine continuously during the season; also 600 or 700 ft. of a large rock cut through the rim-rock to tap the bottom gravels of the channel was practically completed in the latter part of the season, thereby putting the claim in good shape for next year's work.

QUARTZ.

"C. J. Seymour Baker writes me regarding his operations as follows:

"A considerable amount of work has been done on Proserpine Mountain, three miles from Barkerville, and several new reefs opened up, but they all appear to be low grade on the surface. The Forest shaft was bailed out and the fault examined. From its appearance, the reef is thought to be close by.

"Assays were made of galena found and in several places on the mountain the galena went 70 oz. of silver to the ton, and in one case as high as 180 oz., but the quantity is so small and the distribution so irregular that the ore cannot be made to pay as a silver-lead ore. In no other place in the district has galena carrying such high values in silver been found.

"Some quartz veins on Sugar Creek, Island Mountain and near Stanley were examined, but the

highest value found was about \$16 in gold to the ton, and the galena ore 25 oz. of silver to the ton.

"The deposit on Hardscrabble Creek containing scheelite was visited. The scheelite appears to be distributed irregularly in the country rock, which has quartz in lumps and lenses running through it. The quartz often appears to the eye to be much richer in scheelite or in tungstic oxide than the country rock, even where it is actually much poorer, so it is difficult to judge of the value of the ore by its appearance.

"It is doubtful if the scheelite carries any gold or silver, although that near the surface of the bedrock does, but this is believed to be derived from the auriferous alluvial above it."

QUESNEL MINING DIVISION.

The gold commissioner reported:

"Of this portion I regret my inability to speak with any degree of certainty, not having received reports from the various managers, but the report of the mining recorder of the division will be found appended hereto.

"The Luce claim, on Little Snowshoe Creek, was purchased last spring by Graham and Minisci, to whom I am indebted for the following report:

"The present season we operated the mine with a crew of seven men, but had only two months' water. Unfortunately, just as the water had about given out, a large slide came down from the bank and buried the bedrock we had stripped, in consequence of which we were unable to clean up. We were unprepared for the freshet that occurred in the fall and did not use the water. We drifted toward the hill rim for 50 ft., and found the pay of greater width than was expected. We look forward with confidence to a good season next year."

Report by W. Stephenson, Mining Recorder.

"In submitting the annual report, with the estimated yield of gold obtained for the mining season of 1906 from the Quesnel mining division of Cariboo district, it might be inferred from the small amount of gold obtained for the season that this section of the district was becoming unproductive, or, as miners would say, worked out. Such is not by any means the case. The first and real cause of the very apparent shortage of gold obtained is the scarcity of water for the working of hydraulic and other surface mining. As is well known, the winter of 1905-6 the snowfall was very light in this division. Similar conditions have held for the last four winters; consequently, each succeeding year during this period the water in the lakes, swamps and other natural reservoirs has been diminishing, and many of these natural reservoirs have become exhausted by evaporation; a number of the gulches and small streams which were fed from these sources have become altogether dry, while some of the lakes have fallen below the level of the ditch-heads through which the ditches formerly drew their water supply. Through the mining section of this division a large number

of the small mining claims were unable to work for lack of water, and the same was the case with the large hydraulic mines, the water supply having been so limited that they did not attempt to operate during the season. For this reason we have no returns whatever from our chief producers. Owing to the demand, at good wages, for labour, it may be said that desultory mining on the river bars and creeks was abandoned during the season, the men having done better by working for the wages obtainable from the companies and contractors on the preliminary work in constructing roads, digging ditches and other works being pushed as fast as available labour will permit and the materials can be procured. Judging from the work already done and that contracted for, it would seem that mining men and capitalists have confidence in the future of this section of Cariboo district."

(Note by Provincial Mineralogist.—J. B. Hobson has kindly provided the provincial mineralogist with a copy of his report, as manager of the Cariboo Gold Mining Company, to the general manager of the Guggenheim Exploration Company, of New York, from which the following extracts are made):—

CARIBOO GOLD MINING COMPANY.

"I hand you herewith my annual report, which reviews briefly the work carried on at the company's mines during the progress of the season commencing March 1 and ending November 20, 1906. Owing to the impossibility of securing the full number of labourers and mechanics required for excavation and construction work, the season's work turned out a most disappointing one, for the reason that only a small portion of the work on Spanish Lake canal was performed. The increased rate of wages demanded and paid added materially to the cost of the work performed. The failure of the contractors to complete the lower or Bullion section of the Spanish Lake system, which cuts away the old Polley's Lake ditch for a distance of 1 73-100 miles, made it impossible to utilize the water stored in Morehead, Polley's Lake and Boot Jack reservoirs, for mining purposes, in the hydraulic excavation.

"Water Supply.—The quantity of water available for use during the season of 1906, was: From Morehead Lake, 37,000 miner's in.; from Polley's Lake, 31,600 miner's in.; from Boot Jack Lake, 6,100 miner's in.; total, 74,700 miner's in., which is barely sufficient to operate the mine 30 days with 2,500 miner's in. of water.

"It was intended to use this water to take up the high-grade bottom gravel in Pit No. 1, but the failure of the contractors to complete the Lower or Bullion section of the Spanish Lake ditch, which cut out the lower end of the South Fork ditch, made it impossible to deliver the water from Polley's Lake and Boot Jack Lake reservoirs for use at the mine.

"It is expected the contractors will complete the Bullion section on or before July 1, 1907, when mining operations can be commenced in Pit No. 1, and continued to such time as the water supply shall be exhausted.

"The amount of the water supply available at Morehead, Polley's and Morehead Lakes is greater than it has been for several years past, so the outlook for the ensuing season's water supply is quite favourable.

"The water in Spanish Lake reservoir stood 83 in. above the bottom of discharge gates on November 20, and 100 in. on December 27—a rise of 17 in. in 37 days.

"The addition of the Morehead mine having been equipped with a gravity tram, an hydraulic elevator plant, and a Loveridge derrick, may be considered in good condition for the economical removal of the high-grade bottom gravel, which has been uncovered for a distance of 1,500 ft.

"The disintegration of a large quantity of the top deposits by the bank blasts places the high bank of Pit No. 1 in good condition for economical and profitable removal.

"The sluice-tunnel should be completed and ready for use early in the season of 1908.

"Spanish Lake Water Supply System.—The dam built across the outlet of Spanish Lake is 298 ft. long on crest, 31 ft. high; width on top, 12 ft.; inner or water slope, $\frac{3}{4}$ to 1; outer, $\frac{1}{4}$ to 1. It is constructed of barked spruce logs, in cribs of 9 ft. centres, all securely fastened with iron drift-bolts, and rock-filled. The inner slope is sheeted with double 2-in. plank and battens; said sheeting is well bedded in concrete and covered with earth carried up to the discharge gates.

"The water is discharged through three cast-iron, brass-faced gates, 40 in. in diameter, fastened to three 42-in. riveted sheet-steel conduits, each 24 ft. long, which terminate in the outlet flume at head of ditch.

"The structure is completed, with the exception of a small amount of work to complete and make safe the waste weir, and a few cribs to fill with rock at extreme top of structure.

"Spanish Lake Ditch.—By reference to the engineer's report, it will be noted that some work has been done all along the line of ditch, excepting on the Quesnel section. About one mile only is completed on the Bullion section. The whole of the work performed by the contractors will not exceed nine per cent. of the excavation. The contractors, however, appear confident that they will, with the aid of the steam shovels now on the ground, be able to complete the work by the middle of November, 1907.

"Estimated Cost of Completing the Spanish Lake Water Supply System.

"Summary of Estimates:—

Expended during season 1906, as per accountant's books, as follows:—

Spanish Lake dam	\$ 18,282 54
" ditch—	
Payments to contractors..	\$31,177 74
Telephone construction..	710 69

Other payments, covering supervision, engineering, surveying, camp equipment, lumber, material, etc.	13,154 31	45,042 74
Roads to Spanish Lake.....		26,894 28
Bridge, Quesnel Lake crossing.....		7,093 16
Total expenditure for season.....	\$ 97,312 72	
"Estimated Cost to Complete Spanish Lake Ditch System.		
1st Spanish Creek division	\$112,100 00	
2nd division	77,500 00	
Quesnel River section.....	109,500 00	
Bullion section, to complete	9,500 00	
Pipe-lines—		
Poquette line	12,614 25	
South Fork Quesnel Crossing, including bridge	61,016 25	
Right of way, clearing.	6,400 00	
Total estimate to complete.....	\$388,630 50	
To which must be added the 10 per cent. retained on contractors' estimate during 1906, which is still unpaid.	3,299 60	
		\$489,242 82

The mining recorder's report continues:

"I have no returns of gold from the Horsefly section, as there has been no mining nor even prospecting done on the waters of the Horsefly River during the season, but lately five mining leases have been located upon the upper Horsefly, which may cause development of the ground.

"The hydraulic mines on the south fork of the Quesnel River not having been operated during the season, there are no returns from them. On the north fork a few individual white miners have been taking out fair wages during the year.

"Upon the main Quesnel River, from the Forks down, very little mining has been done this season, but quite a number of mining leases, both dredging and bench, have been located.

"Keithley, Snowshoe and other creeks in this vicinity are holding out well, but owing to the limited supply of water, returns for 1906 fall short of average years.

"In regard to lode mining there is little to be said; there have been a few mineral locations recorded, but very little development work done.

"Although the amount of gold obtained for the year is small, the number of new locations and the heavy expenditure on preliminary work done in the opening up of those locations give promise of good returns in the near future."

ANTIMONY IN SLOCAN DISTRICT.

AN ANTIMONY property is being opened up in the Slocan district. The discovery late last season of stibnite, on the north fork of Carpenter Creek, has been reported by the gold commissioner for that district to the Provincial department of mines. The Golden Crown Gold and Silver Mining Company, Lewis Hind, Three Forks, manager, owns the property—the Alps group of three claims situated on a branch of the north fork of Carpenter Creek, $8\frac{1}{2}$ miles from Three Forks and about 7,000 ft. above sea level. The ore occurs in a quartzite dyke about 30 ft. in width and traceable for 4 to 5 miles. Ore has been found in quantity in three places along a distance of about 600 ft. Each good showing is where the vein appears to have been pinched by the intrusion of very hard schist. In two places the ore seems to be in place, lying on the schist, which is the foot-wall while quartzite is the hanging-wall. As a rule the ore occurs clean, but in places it is mixed with soft yellow quartz and is then difficult to sort. Where first found it was in large lumps of high-grade ore, occurring in decomposed quartzite. These weigh up to 1,600 lb. The ore contains as high as 67 per cent. antimony, and small silver and bismuth values as well. The greatest width of ore is about 4 ft., where the vein is well defined. The ore is to be shipped to Scotland for treatment and shipments will be made after the construction of an aerial tramway some 4,000 ft. long already arranged for shall have been completed. Substantial quarters are to be built for the accommodation of a number of men.

The treatment capacity of the Granby Copper Company's smelter at Grand Forks is now at the maximum the enlargement of its six smaller furnaces was intended to reach. With eight blast furnaces, each having a capacity of about 500 tons per diem, the works are equipped for a larger output of copper than at any previous time since they were established. Should there be no difficulty arise in connection with labour and fuel supplies the Granby Company should have a period of renewed profitable operations, mines and smelting works together being equipped for output and treatment of 100,000 to 120,000 tons of ore per month.

In the course of a speech he made before the Canadian Club in Montreal, Quebec, Dr. Alfred Thompson, M. P. for the Yukon, spoke of the mineral wealth of that country. He said that aside from gold, coal of good quality had been discovered, and, as well, silver, copper and iron. Gold of course was the metal to which the country owed its growth and prosperity, and since its discovery in 1896, no less than \$120,000,000 worth of that precious metal had been produced in that country. He described the different methods employed in getting out the gold, explaining the old-fashioned way of using a sluice and grizzly, operated by one man, and comparing it with the present-day methods of sluicing, dredging and other hydraulic mining.

COAL MINING IN BRITISH COLUMBIA IN 1906.

A Record Year in Production of Coal.

PRODUCTION OF COAL in British Columbia in 1906 reached a higher total than in any previous year in the history of coal mining in the Province and this notwithstanding that a strike at the Crow's Nest Pass Coal Company's collieries lasted practically two months and kept the gross production of the company's mines down to a total nearly 25,000 tons less than that of 1905 instead of showing an increase that under conditions prevailing immediately prior to that interruption to operations would have resulted in an enlarged output by probably 150,000 tons. The gross output, which includes all coal used in the manufacture of coke, was 1,899,076 tons (2,240 lb.) in 1906, as compared with 1,825,832 tons in 1905, this giving an increase in gross production of 73,244 tons. The net production, which is what is taken into account in the statistics of quantity and value recorded each year by the bureau of mines, was 132,991 tons larger than that of 1905, there having been less coal made into coke last year, and consequently a smaller production of coke. But for the labour trouble referred to the gross production of coal in the Province last year would have exceeded 2,000,000 tons, which point in material progress should be reached by the close of the current year.

The following review of coal mining in 1906 is from the "Annual Report of the Minister of Mines" for that year. The reports of the inspectors of mines, dealing with the various mines of the several producing collieries of Vancouver Island and the Crow's Nest Pass districts, respectively, are too long to admit of their being reprinted in this number of the MINING RECORD. The summary prepared by the provincial mineralogist, however, shows that coal mining is receiving increasing attention and that the addition of other properties to the list of producing mines may be looked for ere long. The official review is as follows:

Although workable coal seams have been proven in several places scattered over the Province, the only coal-fields actually producing coal are the Vancouver Island coal-field, on the east coast of Vancouver Island, and the Crow's Nest Pass coal-field, situated in the extreme southeastern portion of the Province, on the western slope of the main range of the Rocky Mountains. In the former field two companies are operating, the Wellington Colliery Company, Ltd., at Extension and Comox, and the Western Fuel Company at Nanaimo; in the Crow's Nest field the three collieries opened are all operated by the Crow's Nest Pass Coal Company, Ltd.

The collieries of British Columbia have felt the wave of general prosperity which has swept over the country, and now find themselves in such a position that they have more orders for coal and coke than they can fill. It seems probable that this condition

will exist for some time to come. The mines are all sufficiently developed and equipped for a larger tonnage than is at present produced, and to some extent the present stringency of coal supply can be attributed, but rather, it is claimed, to the scarcity of labour, both skilled and unskilled, to mine the coal and operate the mines on a more extensive scale.

The gross amount of coal mined in the Province during the year 1906 was 1,899,076 tons (2,240 lb.), an increase over the preceding year of 73,244 tons. Some 381,773 tons of this coal was manufactured into coke, of which there was produced 199,227 tons.

The distribution of this output of coal and coke is shown in the following table:

Sales and Output for Year (Tons of 2,240 lb.)	Coal.		Coke.	
	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	681,889		149,191	
Sold for export to United States	670,279		66,704	
Sold for export to other countries				
Total sales		1,361,728		210,897
Used in making coke	381,773			
Used under colliery boilers, etc.	170,416			
Total for colliery use		552,189		
Retailed locally		2,389		
		1,916,306		
Stocks on hand first of year	30,456		13,227	
Stocks on hand last of year	13,227		1,558	
Difference taken from stock during year		17,230		11,670
Output of collieries for year		1,933,536		199,227

The number of hands employed appears in the next following table, the first column showing those working underground and the second those above ground:

Character of Labour.	Underground.			Above Ground.		
	No. Employed.	Wages Paid.	Value of Work Done.	No. Employed.	Wages Paid.	Value of Work Done.
Supervision and clerical assistance	87	63	150			
Whites—Miners	1,396		1,396			
Miners' helpers	441		442			
Blacksmiths	660		471	1,131		
Mechanics and skilled labour	319	270	589			
Boys	132	50	182			
Indians	73	13	86			
Chinese	281	493	774			
Indians and Hindus	24	30	55			
Totals	3,415	1,390	4,805			

The spring of 1907 witnessed the unprecedented occurrence of a Vancouver Island smelter importing coke from Australia, and an Alaskan smelter temporarily shut down for lack of British Columbia coke. The collieries of the Crow's Nest Pass—both in British Columbia and across the Provincial boundary, in Alberta—have had a greater demand for coal and coke than they could supply, which is partly due to shortage of labour, combined with a labour dispute in the autumn, and partly to a shortage of cars to move the coal, the railways being also handicapped later by heavy snowfalls.

While not yet producing coal in the commercial sense, certain properties in the Nicola Valley are being opened up systematically since the completion of the railway from Spence's Bridge, on the Canadian Pacific railway, to the coal-field at Nicola, and at least one of these properties will be shipping coal during the year 1907.

The Nicola Valley Coal and Coke Company, under the management of Alex. Faulds, formerly with the Wellington Colliery Company, has opened up a coal seam on its property, and has a prospecting slope now down 1,000 ft., at an angle of about 25 deg., on a seam of coal 6 to 8 ft. thick. A tunnel is being driven to strike the seam at the level of the bottom of this slope; this tunnel will be used as the working tunnel through which the coal will be brought out, and at the mouth of which the tippie will be placed. Development has so far progressed that the property should be shipping in 1907.

The following are analyses of coal and coke from the Nicola Valley:—

Sample.	Moisture.	Volatile Comb. Matter.	Fixed Carbon.	Ash.	Sulphur.	British Thermal Units.	Coking Properties
Nicola Jewell	3.4	34.9	56.7	5.0	0.65	12,486	Fair.
Coal from Princeton.....	3.4	34.3	54.1	8.2	0.74	12,176	Fair.
Nicola coke	1.2	1.2	84.0	13.6	0.63	11,215	....

The Diamond Vale Coal and Iron Company, of Nicola, has made extensive tests of its coal areas with a diamond drill and has selected a site for its colliery plant. A shaft has been started through the overlying surface deposits and is down some 50 ft., but trouble is experienced with water and good progress is not being made.

The lignitic-coal deposits in the vicinity of Princeton, Similkameen, have remained with little or no further development done on them; much development could scarcely be expected until a railway is actually constructed to the camp.

Prospecting for coal continues in the vicinity of Kamloops, but no property has been opened up as yet.

No fresh developments worthy of note have occurred in the Flathead district of East Kootenay.

Some further prospecting work has been done up Elk River, but no active development of the known seams has taken place.

The Pacific Coal Company, at Hosmer, between Fernie and Michel, on the Canadian Pacific Railway

Company's Crow's Nest line, has begun active operations, and at the end of the year had two tunnels driven in on the coal for a distance of 1,000 ft. each; the larger of these tunnels is 8 ft. 6 in. x 22 ft. in the clear and the smaller 8 ft. 6 in. x 13 ft. It is proposed to take the coal from these tunnels to the tippie by an incline 4,000 ft. long. This property also should become a producer during the coming year.

The Crow's Nest Pass Coal Company on April 1, 1906, abandoned work, at least temporarily, at its Carbonado collieries.

Dr. R. W. Ellis' report on the coal measures of Queen Charlotte Islands will be found on pages 74 *et seq.* of this "Annual Report"; and a report by W. W. Leach, also of the Geological Survey of Canada, on the coal of the Telkwa valley is reproduced on pages 95 *et seq.* of the report.

Some notes on the coal formation of the Peace River Valley, by the provincial mineralogist, will be found on pages 101 *et seq.*

On Vancouver Island by far the greater area of the possible coal-producing measures is included in the grant of land made to the Esquimalt & Nanaimo Railway, and the coal that may be therein is now owned by the Dunsmuir interests, and as they have sufficient coal land being worked and explored to last for some years, no active steps need be taken by them to further prospect at present. Certain areas of land, however, in the Railway Belt, had been alienated from the Crown before the railway grant was made, and these carry with them the coal rights. On an area of this description bore-holes have been sunk in the Cedar district, near Nanaimo, with fair

prospects of success; and similar work is about to be begun near Comox.

Some prospecting has been done on the coal seams in the vicinity of Fort Rupert on the northeast coast of the island, but no definite results have been announced.

Active development of the coal measures on Tumbo has again been started, after many years of inactivity.

VANCOUVER ISLAND COLLIERIES.

The gross output of coal from the Vancouver Island collieries for the year 1906 was 1,178,627 tons (of 2,240 lb.) of coal actually mined, in addition to which 17,230 tons were taken from stock, making together an actual consumption of 1,195,857 tons. Of this gross consumption 980,072 tons were sold as coal, 138,057 tons were consumed by the producing companies, and 77,728 tons were manufactured into coke, of which there was produced in 1906 some 9,842 tons (2,240 lb.), and there was taken from stock piles some 13,009 tons, making the total coke sales for the year 22,851 tons.

The report of the inspector for the Vancouver Island inspection district shows that there were in operation on the island three collieries, viz., those of the Western Fuel Company at and near Nanaimo, and the Wellington Colliery Company, Ltd., at Extension and Cumberland, respectively.

The Western Fuel Company in 1906 worked the following-named mines, under the direction of Thos. R. Stockett, Jun., as general manager, and Thos. Graham as superintendent: No. 1 shaft, Esplanade, Nanaimo, and Protection Island mine, Thos. Mills, mine manager; No. 4, Northfield, George Wilkinson, mine manager.

The Wellington Colliery Company, Ltd., operated the undermentioned mines: Extension colliery in Cranberry district (Extension), Andrew Bryden, manager, with Nos. 1, 2 and 3 mines all worked from what is known as the No. 1 tunnel; Union colliery, in Comox district (Cumberland), John Matthews, manager, with Nos. 4 and 7 slopes and Nos. 5 and 6 shafts.

Permission having been given to publish the returns of the Wellington Colliery Company, Ltd., the following information has been taken from them:

	Tons of 2,240 lb.
Coal sold for consumption in Canada.....	408,399
“ “ “ export to United States.....	221,000
“ “ “ to other countries.....	15,673
Total quantity sold	645,072
	Tons.
Coal used in making coke.....	77,728
“ “ under colliery boilers....	98,923
Total for colliery use.....	176,651
	821,723
From stock on hand Dec. 31, 1905.....	18,775
Gross output for year	802,948

The quantity of coke sold was 22,851 tons, of which 13,009 tons came from stock on hand at first of the year and 9,842 constituted the year's output. The tonnage for consumption in Canada was 14,547 tons, and for export to United States 8,304 tons.

The total number of persons employed by the Wellington Colliery Company was 1,938, including 281 Chinese, 73 Japanese and 22 Hindus. Average daily wage ranged from \$1 (lowest pay to white boys) to \$4.50 (white miners), and up to \$5 for mechanics. Extension mines employed 824 persons and Cumberland mines 1,114.

CROW'S NEST PASS COLLIERIES.

The district inspector's report gives information relative to three extensive collieries on the western slope of the Rocky Mountains in East Kootenay district the Crow's Nest Pass Coal Company, Ltd., is operating, viz., Coal Creek colliery, situated on both sides of Coal Creek, about five miles from the town of Fernie, on a branch railway to the mines; Michel colliery, on both sides of Michel Creek, on the Canadian Pacific Railway Company's Crow's

Nest Pass line, about 20 miles in a southeasterly direction from Fernie; and Carbonado colliery, on Morrissey Creek, connected by a four-mile branch line with the Canadian Pacific and Great Northern railways at Morrissey, and distant from Fernie 14 miles in a southeasterly direction.

Coal Creek colliery, Andrew Colville, mine manager, worked last year Nos. 1, 2, 4, 5, and 9 mines and employed 1,117 persons. Its output of coal for the year was 426,793 tons of coal, of which 149,753 were used in making coke, producing 93,171 tons of the latter commodity. Michel colliery, Charles Sinister, mine manager, worked Nos. 3, 4, 5, 6, 8, and 9 mines and employed 628 persons. Its output of coal was 273,497 tons of coal, of which 154,292 tons were used in making coke, producing 96,214 tons. Carbonado colliery was closed at the end of March, 1906, and has not since been worked. Its output for three months totalled 20,159 tons.

The Crow's Nest Pass Coal Company's total output of 720,449 tons (2,240 lb.) of coal was disposed of as under:

	Tons.
Sold for consumption in Canada.....	150,793
“ “ export to United States.....	230,863
Total quantity sold	381,656
	Tons.
Used in making coke	304,045
“ under colliery boilers.....	32,359
Retail coal	2,389
Total for colliery use.....	338,793
Output of collieries for year.....	720,449
The coke made was disposed of thus:	Tons.
Sold for consumption in Canada.....	134,646
“ “ export to United States.....	53,400
Total quantity sold	188,046
Placed in stock	1,339
Output for year	189,385

No coke was made at the Morrissey ovens in 1906.

The Yukon Consolidated Goldfields Co., a Guggenheim organization, which last summer commenced the construction of a hydro-electric plant on Little Twelve-mile river for the purpose of supplying electric power for the operation of its gold dredges, and the excavation of a big ditch from Twelve-mile river to its extensive area of gold-bearing ground on Hunker and Bonanza creeks, expects to shortly have three steam shovels at work on the ditch. Two of these are already in position for starting work, which they will do probably about June 1, and a third has been ordered to arrive early in the season. The power station, transformer station, and a 33,000-volt transmission line 30 miles in length, for the above-mentioned hydro-electric system, were practically completed several months ago.

MINING IN VARIOUS PARTS OF BRITISH COLUMBIA.

Excerpts from "Annual Report of Minister of Mines for 1906."

REPORTS from gold commissioners and mining recorders, published in the "Annual Report of the Minister of Mines for 1906," give information and statistics relative to mining in their respective districts or divisions. A few excerpts from these are as under:

LORNE CREEK, SKEENA MINING DIVISION.

The provincial mineralogist notes that: "At Lorne

removed by the stream of water at present available through the existing pipe-line and plant. Although, so far, the proposition has not been a paying one, the management has hopes of ultimate success, owing to the marked improvement shown in the character and grade of the bedrock and the narrowing up of the channel."

REVELSTOKE MINING DIVISION.

The gold commissioner for Revelstoke district reported of placer mining in 1903: "The Revelstoke and McCulloch Creek Hydraulic Mining Company's ground, under the management of J. D. Sibbald, promises to turn out well, and now that the old



Pintledanne Pass, Looking East. (Between Kemano River and Ootsa Lake.)

Creek are situated the workings of the Dry Hill hydraulic mines, at a distance of about a mile from the river and at an elevation about 300 ft. higher. The ground here is being sluiced for gold in what is supposed to have been the old bed of Lorne Creek, which had long ago been filled in by a slide from the mountain, the stream being thereby diverted to its present channel. The ground undoubtedly contains gold in considerable quantities, but its recovery is rendered difficult by an exceedingly irregular bedrock and the presence of a great number of boulders, which require to be broken up before they can be

workings have been cleared away and virgin ground struck, a record can be looked for. French Creek had a revival of interest during the close of the season. Smith Creek is on the eve of a busy year. The new company, under the management of F. H. Guffey, has installed an up-to-date ferry, crossing the Columbia River at the mouth of Smith Creek, erected a saw-mill, constructed some seven miles of trail, and has ordered the necessary machinery for a first-class hydraulic plant."

The report of the mining recorder for the division contains the following: "During the past year but

little development work has been done on the mines in this division, other than the necessary annual assessment work, except by the Prince Mining and Development Company, Ltd., at the headwaters of Downie Creek, which has kept a force of men on all the season. A large amount of work has been done on these properties—upwards of 3,000 ft. of tunnelling and shafts. The ore-bearing body has been proved to a depth of 400 ft., and found to be from 2 to 10 ft. in thickness. A tramway route to the river has been surveyed, which is less than six miles in length and is pronounced perfectly feasible. The company owns 20 mineral claims and fractions, 18 of which are Crown-granted. The properties are situated 30 miles up the Columbia River from Revelstoke, where the head office of the company is located.

"On the Revelstoke group of eight mineral claims, located by Neil McEachern and others in 1905, 10 miles south of Revelstoke, on the west side of the Columbia River, the surface showing consists of a ledge of free-milling quartz about 200 ft. wide. Mr. McEachern has run 150 ft. of tunnel, besides open cuts and cross-cutting on the ledge at different points. Some specimens show gold to the naked eye."

VERNON MINING DIVISION.

The mining recorder for this division had little or no improvement in 1906 to report. He said: "There has not been much activity in mining matters in this division during the past year. The most important work was done on the British Empire and Royal Standard claims, near Okanagan Landing. On these a 5-stamp mill ran for 120 days, and gold was recovered on the plates. The mill was shut down in November and has not since resumed operations. Want of capital is still seriously interfering with the proper development of these claims."

"Some work was done last June on the Last Chance mineral claim, a rather promising silver-lead proposition situated on the north bank of Trout Creek, about 8 miles up from its mouth. It has two pay streaks 10 and 12 in. wide, respectively, and some picked specimens ran as high as 100 oz. of silver to the ton and 50 per cent. lead. There is one tunnel driven in about 120 ft., at a dip of about 45 deg."

"Take it all round, last year was decidedly an off year."

ASHCROFT MINING DIVISION.

The official notes on this division are brief. The recorder reported: "There has been practically no change for the last couple of years. The office statistics show a small decrease all round, although the reports continue favourable, and the owners of mineral claims are in nearly all cases keeping up their assessments. There has, however, been very little legitimate mining done. No placer mining has been engaged in to speak of, the Fraser River Gold Dredging Company having ceased all operations for the present."

YALE MINING DIVISION.

There was practically nothing of importance to report of this division, so the mining recorder's summary for 1906 was brief, as under:

"Placer Mining.—The Pacific North-West Company, on Siwash Creek, continued the extension of its open cut and laying sluice boxes, with a view of striking bed-rock."

"Dredging.—The Yale Syndicate, composed of New Zealand capitalists, has completed its dredging plant, and is ready to make a practical test of the Fraser River bed at Hill's bar, as soon as weather shall permit."

"Mineral Claims.—The Mount Baker and Yale Mining Company, on Siwash Creek, has done the usual assessment work."

"The Marvel Gold Mining Company has five mineral locations, and has extended its tunnel into the mountain, meeting with encouraging prospects. These properties give assay values in gold from four different ledges. A 6-stamp Merrill mill has been installed on this property."

"The Bonanza location, near Hope, is owned by Wardle & Co., who extended the tunnel during the past season."

"In the vicinity of Hope considerable activity has been evidenced by a number of locations recorded in Coquihalla and Skagit Valleys; also on Ladner Creek. In the event of construction of the V., V. & E. railway, a large amount of prospecting may be expected in the country bordering on the line of construction."

SIMILKAMEEN MINING DIVISION.

Beyond a brief reference to coal at Princeton appearing in the comments of the provincial mineralogist under the head of "Coal Mining", there is no reference made to coal in this division. The mining recorder reported of other mining:

"A few Chinese were engaged in placer mining above the mouth of Bear Creek."

"On Copper Mountain the majority of the claims are Crown-granted, and on the remainder assessment work has been done."

"The owners of the St. George, St. Helen and St. Lawrence mineral claims, on Bear Creek, who, with the assistance of the Government, built a wagon road some 12 miles long, have started to develop their property by means of a shaft. At the 120-ft. level a body of high-grade ore was struck, which continues with depth."

"At the head of this creek a group of claims, known as the Independence, has been bonded to a New York syndicate, which has a force of men running a tunnel to prospect the ground."

"I have nothing of importance to report concerning other portions of the district, owners satisfying themselves with doing merely sufficient work to hold their claims."

The smelting industry in Canada is officially stated to have increased from over \$7,000,000 in 1901 to over \$28,000,000 in 1906.

COMPANY MEETINGS AND REPORTS

SNOWSHOE GOLD AND COPPER MINES, LTD.

The London *Critic* on June 8 published the following:

The report of the Snowshoe Gold and Copper Mines, Ltd., for the year ended September 30, 1906, to be presented at the meeting on 13th inst., states that during the greater part of the year the Snowshoe mine remained closed down pending the completion of satisfactory arrangements for dealing with the property, and consequently the accounts show a further loss. As the shareholders have already been informed, an agreement was signed on June 23, 1906, leasing the mine to the Consolidated Mining and Smelting Company of Canada, Ltd. Under this agreement, rather more than 6,000 tons of ore had been sent to the smelters at September 30, averaging approximately 0.08 oz. gold, 0.3 oz. silver and 1.4 per cent. copper. The total royalties received have amounted to £1,997 upon the shipments made under this agreement. Since the close of the financial year the original lease has been cancelled by mutual consent, and a new lease substituted, the terms of which the directors consider to be more advantageous to this company. During recent months, the exceptionally severe winter in Canada and the strikes of coal miners have considerably interfered with operations at the mine, but the lessees hope to be in a position shortly to maintain a regular output of more than 10,000 tons per month. Numerous improvements have been made on the property, and the company's representative in British Columbia reports that the lessees are carrying out all work in a very thorough and systematic manner. For the seven months to April 30, 1907, the output has amounted to about 25,000 tons, more than half of this tonnage having been shipped during the months of March and April. Since September 30 last, the liabilities have been reduced by approximately £7,000.

YMIR GOLD MINES, LTD.

The report of the Ymir Gold Mines, Ltd., to March 31, 1907, prepared for presentation at the general meeting of shareholders on July 2, stated that expenditure on development operations for the period under review was £167,079, of which £133,708 was derived from ore treated. This leaves a balance of £33,371, representing the cost of development operations from November, 1902, to date. Included in this amount is the cost of exploration work for the new vein, the extensive driving done in levels Nos. 5, 6, 7 and 10, the cutting of a canal for increased water power and the 300 ft. of raise from the tenth to the seventh level. The directors consider that a very large proportion of this outlay is in the nature of capital expenditure, and can properly be added to the cost of the property, leaving the remainder to be gradually written off profit and loss in future years. The London administration expenditure amounting to £6,112 (inclusive of interest on loans and accrued debenture interest) for a period of four and one-third years will be written off as profits become available for this purpose. In the circular of January 17 last, full explanations were given of the series of misfortunes which culminated in the crisis involving the provision of additional capital. This was arranged by the guaranteed subscription of £40,000 of 10 per cent. debenture stock at par, part of an authorized issue of £50,000. The holders of this stock have the option of converting it into shares at par, and the consent of the shareholders to the resolution authorizing the necessary increase of capital was to be required at the extra-ordinary general meeting to be held at the conclusion of the ordinary meeting. The reasons for the long delay in holding the meeting have also been explained. With the funds available immediate steps were taken to carry out the recommendations of the consulting engineer; and, although some time was unavoidably lost in commencing the work, very gratifying progress has since been made. The raise from the tenth to the seventh level (enabling the good ore to be kept separate from the waste rock) has been completed; the compressor has been moved, and is now driven by water power, thus effecting a saving in fuel of over £1,500 per annum, with largely increased

carried on to complete the scheme of development laid down

be kept running. The special exploratory work in connection with the new vein has now reached a very interesting stage, and at any moment news may be received of the success of this most important work. The directors desire to express their appreciation of the services of the manager, Horace G.

peculiar difficulty. Notwithstanding the large amount of ore mined during the company's history, from which bullion and concentrates have been sold to a value of over £430,000, there is an immense area of unworked ground above the adit level, which may confidently be expected to produce many thousands of tons of payable ore. Below the adit (or drainage) level the company has a virgin mine, and having regard to the strength of the vein at this level (it is in places over 15 ft. wide) and to the fact that the experts advise that the riches in the upper levels are not the result of surface enrichment, there is good reason to hope that the vein will live to great depths and produce large quantities of payable ore. With the addition of ore from the new vein there should be no difficulty in again putting the full 80 stamps in commission. As shareholders have been previously advised, Morland Hughes, who has now a large financial interest in the company, and Robert Gilman Brown, the consulting engineer of the company, have joined the board, the latter as technical director.

RAMBLER-CARIBOO MINES, LTD.

From the Kaslo *Kootenai* it is learned that the annual general meeting of the Rambler-Cariboo Mines, Ltd., was held at the company's office, Kaslo, on June 11. There was a good attendance of shareholders, who with the proxies held by them, represented 1,256,875 shares. A. F. McClaine, president of the company, occupied the chair, and A. W. Allen was appointed secretary.

The directors report, covering a period of twenty-three months, together with the audited financial statement and the manager's report, were presented and adopted.

The manager's report was a brief, concise report of operations mainly concerning the successful completion of the long tunnel.

The old board of officers was re-elected, E. E. Chipman chosen auditor, and the following appointed directors for the year: A. F. McClaine, A. Coolidge, J. Armstrong, Harry Cornwall, P. W. Lawrence, B. W. McPhee and W. E. Zwicky.

RICHARD III. MINING COMPANY, LTD.

A general meeting of the shareholders of the Richard III. mine was held on June 8 at Duncans. The report of the directors was adopted. In this report it was recommended that a dividend of 2½ per cent. be declared, payable on and after June 15. The treasurer announced after paying this dividend there would be a reserve of over \$10,000 for carrying on development work. Ore is being shipped to the Tye Copper Company's smelter at Ladysmith, at a good profit. The management has adopted the plan of following the ore, and is keeping two shifts of miners at work in the development of the property. It is hoped by the directors that hereafter dividends will be paid at regular intervals.

Zinc ore from the Lucky Jim mine, stored at the Kootenay Ore Sampling Works, Kaslo, since last summer, is being shipped to Gas, Kansas, U.S.A.

The production of cement in Canada increased more than tenfold during the last decade. In 1897 it was: Natural rock, 83,450 bbl.; portland, 119,763 bbl.; total value, \$275,273. In 1906 the official estimate showed: Natural rock, 8,610 bbl.; portland, 2,139,164 bbl.; total value, \$3,170,850.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi—May: Shipped to Northport 10,930 tons, containing 2,495 oz. gold, 4,972 oz. silver, and 272,100 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, \$17,500. Expenditure on development work during the month, \$13,000.

Le Roi, No. 2—May: Josie mine report: Shipped 1,940 tons; net receipts, \$33,106, being payment for 2,135 tons shipped, and \$870 for 57 tons concentrates shipped, in all \$33,976. Vancouver mine report: Shipped 10 tons; net receipts \$10,342, being payment for 173 tons concentrates shipped.

Le Roi No. 2—The following cable has been received with regard to the diamond drilling on the 900-ft. level, and which has passed through 16 ft. of ore (not the Hamilton vein) at 317 ft. below that level: Ore struck on the following points: 317 ft. to 319 ft., heavy; 319 to 327, light; 327 to 330, heavy; 330 to 332, light. Drilling assays as follows: 316 to 319, gold 1.04 oz., copper, 1.60 per cent.; 327 to 328, gold 0.22 oz., copper 1.40 per cent. Assays cores will be forwarded at once.

Slough Creek—The manager cables:—"Now drawing off 921 gal. per minute; pressure No. 5 bore, 87 lb.; No. 10 bore, 93 lb. per sq. in.

Ytee—May: Smelter ran 25 days, treating 1,114 tons of Ytee ore; value, after deducting refining charges, equal to \$13,287; 4,713 tons of custom ore—5,827 tons, producing a total of 458 tons of matte. (Office note—"The 'gross value of contents' (\$7,658) given in circular issued last month, referred to Ytee ore only, and did not include custom ores. This method of making returns will hereafter be adhered to.)

U. S. A.

Alaska Mexican—May: 120-stamp mill ran 21½ days, crushed 16,210 tons ore; estimated realizable of bullion, \$18,359. Saved 320 tons sulphurets; estimated realizable value, \$17,398. Working expenses, \$23,688.

Alaska United—May: Ready Bullion claim: 120-stamp mill ran 23 days, crushed 16,500 tons ore; estimated realizable value of bullion, \$12,970. Saved 213 tons sulphurets; estimated realizable value, \$7,150. Working expenses, \$22,790.

Alaska Treadwell—May: 240-stamp mill ran 28½ days, 300-stamp mill ran 9½ days, crushed 45,500 tons; estimated realizable value of bullion, \$60,404. Saved 784 tons sulphurets; estimated realizable value, \$43,249. Working expenses, \$54,439. We have sufficient labourers and three-quarter crew machine men; making good progress obtaining new men.

DIVIDENDS.

The International Coal and Coke Company, Ltd., has declared a dividend of one and one-half cent., payable on August 1. Transfer books will be closed from July 16 to August 1, both inclusive.

The Crow's Nest Pass Coal Company, Ltd., has declared its customary quarterly dividend, at the rate of 10 per cent. per annum, payable on July 1.

On June 4 the Granby Consolidated Mining, Smelting and Power Company, Ltd., made its seventh declaration of payment of dividend. Amount of this distribution was \$3 per share—\$405,000—paid June 29. Total of dividends to date is \$2,563,630.

The Richard III. Mining Company, Ltd., of Duncans, Vancouver Island, has paid its first dividend—of two and one-half per cent.—on June 15.

The twelfth dividend of the Canadian Goldfields Syndicate was paid recently. It was at the rate of 1¼ per cent. on the capital stock, and the total was \$11,500.

NOTES.

The *Hedley Gazette* states that three diamond drills are constantly in operation on the properties of the Yale Mining Company, Similkameen, working day and night shifts.

The solicitors for the Ymir Gold Mines, Ltd., have advertised notice of intention to apply to the presiding judge in chambers for an order extending the time for registering a certain trust deed dated March 25, 1907, between the Ymir

Gold Mines, Ltd., of the one part, and C. M. C. Hughes and Oliver Wethered, of the other part, until July 20, 1907.

A circular recently issued from the head office in London to the shareholders of the Ymir Gold Mines, Ltd., announces that the raise from the tenth to the eleventh level is completed, that good pay ore was taken out in the course of the work, that an assay value of \$13 was obtained, that crushing will begin before the end of June with 20 stamps in operation on ore from development, and that H. G. Nichols, manager, is confident of the success of the policy recommended by Gilman Brown, the company's consulting engineer.

In regard to development work on the Hamilton vein in the *Le Roi No. 2* company's mine at Rossland, the manager, P. S. Coudrey wrote on May 16, as follows: "As reported to you by cable, we have succeeded in locating what is undoubtedly the Hamilton vein on both the 700 and 900-ft. levels. On the 700-ft. level the streak is now 85 ft. long and since the beginning of the month has averaged 1.78 oz. gold and 0.9 per cent. copper; while on the 900-ft. level, which is 41 ft. long, for the month has averaged 0.71 oz. gold and 0.71 per cent. copper. On the 16th inst. we had an assay from the 900-ft. level of 5.82 oz. gold and 0.5 per cent. copper. For the seven days previous the assays from the 900-ft. level have run as follows: Gold, 0.58 oz., 0.18, 0.14, 2.36, 0.54, 1.98, 5.82; copper 0.5 per cent., 0.5, 0.3, 0.6, 0.6, and 0.5."

A special general meeting of the shareholders of the Goodenough Mines, Ltd., will be held at Kaslo, on the afternoon of August 6. Included in the business will be consideration of an offer to lease (with option of purchase) all the property and assets of the company.

Creditors of the Vancouver Mining and Smelting Company, Ltd., (in liquidation) are required on or before August 2, 1907, to send their names and addresses, and particulars of their debts or claims duly verified, to the liquidator, H. T. Ceperley, Molson Bank Building, Vancouver, B. C.

REGISTRATION OF EXTRA-PROVINCIAL COMPANIES.

Alberta Fuel Co., Ltd.—Head office at Spokane, Washington, U. S. A. Capital, \$100,000, divided into 1,000 shares of \$100 each. Head office in British Columbia at Grand Forks. Attorney, George M. Fripp, Grand Forks.

Bella Coola Copper Co.—Head office at Spokane, Washington, U. S. A. Capital, \$2,000,000, divided into 2,000,000 shares of \$1 each. Head office in British Columbia at Vancouver. Attorney, A. Mogridge, hotel clerk, Vancouver.

Falls Creek Copper Mining Co., Ltd.—Head office at Spokane, Washington, U. S. A. Capital, \$1,500,000, divided into 1,500,000 shares of \$1 each. Head office in British Columbia at Nelson. Attorney, Michael C. Monaghan, miner, Nelson.

Copper Mountain Mining Co.—Head office at Phoenix, Arizona, U. S. A. Capital, \$500,000, divided into 500,000 shares of \$1 each. Head office in British Columbia at Vancouver. Attorney, (not empowered to issue and transfer stock), Edgar Bloomfield, barrister, Vancouver.

Jewel Syndicate, Ltd.—Head office in Scotland. Capital, £25,000, divided into 25,000 shares of £1 each. Head office in British Columbia at the Jewel mine, Long Lake, Boundary district. Attorney, Richard Roberts, mining engineer, Greenwood.

Allis-Chalmers-Bullock, Ltd.—Head office in Montreal, Quebec. Capital, \$2,500,000, divided into 25,000 shares of \$100 each. Head office in British Columbia at 416 Seymour Street, Vancouver. Attorney, E. H. Breed, sales manager, Vancouver.

Vancouver Copper Co., Ltd.—Head office in England. Capital, £110,000, divided into 110,000 shares of £1 each. Head office in British Columbia at Victoria. Attorneys, Frederick Peters, K.C., and Charles E. Wilson, barrister, Victoria.

CERTIFICATES OF INCORPORATION.

- Maple Leaf Mines Ltd.*, with a capital of \$250,000, divided into 250,000 shares of \$1 each.
- Portland Canal Mining and Development Co., Ltd.*, with a capital of \$100,000, divided into 325,000 shares of 25 cents each and 150,000 shares of 12½ cents each.
- Yamvale Coal Prospecting Co., Ltd.* with a capital of \$20,000, divided into 20,000 shares of \$1 each.
- British Columbia Concrete Block and Brick Company, Ltd.*, with a capital of \$30,000, divided into 300 shares of \$100 each.
- Port Haney Brick Co., Ltd.*, with a capital of \$50,000, divided into 500 shares of \$100 each.
- Canadian Marble and Granite Works, Ltd.*, with a capital of \$150,000, divided into 1,500 shares of \$100 each.
- Vulcan Iron Works, Ltd.*, with a capital of \$50,000, divided into 500 shares of \$100 each.

COMPANIES REGISTERED IN ENGLAND.

- Alberta Development Syndicate, Ltd.*—Registered April 16, with capital £6,300, in 6,000 preferred shares of £1 each and 6,000 deferred shares of 1s. each, to adopt an agreement with the Cobalt Mines and Exploration Syndicate, Ltd., to acquire and hold shares, stocks, debentures, debenture stock, bonds, obligations, and securities issued or guaranteed by any company constituted in the United Kingdom, Canada, or elsewhere. No initial public issue. Table A mainly applies; remuneration of directors, 5 per cent. of the net profits, divisible. Registered office: 41 Threadneedle Street, London, E. C.
- Anglo-Canadian Syndicate, Ltd.*—Registered May 3, with capital £5,000, in £1 shares, to carry on the business of financiers, underwriters, dealers in stocks, shares, debentures, bonds, and securities, miners, quarryers, etc. No initial public issue. The subscribers are to appoint the first directors; qualification, £100; remuneration, £100 each per annum. Registered office, 31 and 32 Broad Street Avenue, London, E. C.
- Western Canada Investment Company, Ltd.*—Registered April 24, by Nicholson, Graham & Beesly, 24 Coleman street, London, E. C. Capital £100,000, in £1 shares. Objects: To carry on an investment, financial, and agency business in Canada or elsewhere; to seek and secure openings for the employment of capital in any part of the world; to search for, prospect, examine, and explore mines and ground supposed to contain minerals or precious stones; to acquire, hold, dispose of, and deal with gold, silver, copper, lead, tin, quick-silver, iron, coal and other mines, mining, water, timber, and other rights, etc. No initial public issue. The first directors (to number not less than three nor more than five) are: C. Bulkeley-Johnson, of Gladwood, Melrose, N. B.; R. D. Fordyce, Brucklay Castle, Aberdeenshire; and A. Partner, The Briars, Tolworth, Surbiton. Qualification, 500 shares. Remuneration as fixed by the company. Registered office: 24 Coleman Street, London, E. C.

NOTICES IN THE BRITISH COLUMBIA GAZETTE.

Edward Edwards of Revelstoke, to be acting gold commissioner for the Revelstoke, Illecillewaet and Trout Lake mining divisions during the absence of Frederick Fraser, gold commissioner.

Margaret K. Dodd of Yale, to be acting mining recorder for the Yale mining division during the absence of William Dodd.

Constable Angus M. Ego of Lillooet, to be deputy gold commissioner and deputy mining recorder for the Lillooet mining division from July 15, during the absence of Caspar Phair.

Thomas George McEwen, to be acting gold commissioner in British Columbia for the Ymir Gold Mines, Ltd., in place of E. M. Hand, whose appointment has been revoked.

PRODUCTION NOTES.

The first shipments of gold from Alaska this season have reached Seattle. The value of that brought by two steamers was \$1,663,920.

East Kootenay's mineral production in each of two successive years has exceeded \$5,000,000. Lead was highest in 1906, with coal a close second, each in excess of \$2,000,000. The relative positions of these minerals were the reverse in 1905. The greater part of the remaining value was in silver.

Ore receipts at this company's smelting works at Trail during May totalled 27,363,959 lb. The chief shippers were the Centre Star group, Rossland, 17,312,780 lb.; Le Roi No. 2, Rossland, 4,261,380 lb.; Victoria, Nelson, 1,948,520 lb., and St. Eugene, East Kootenay, 1,154,145 lb. Ten other mines shipped the remaining 2,687,134 lb. Ores containing copper, gold, and silver totalled 24,696,640 lb.; silver and lead, 2,375,973 lb.; and gold and silver, 291,346 lb.

Published report of ore production for month of May at this company's mine, situated near Kimberley, East Kootenay, is as follows: On hand April 30, 3,370 tons; mined in May, 2,210 tons; total, 5,580 tons. Shipped to company's smelter at Marysville, East Kootenay, 2,259 tons; on hand May 31, 3,321 tons. At the smelter 2,478 tons were smelted during the month; bullion shipped, 402 tons, valued at \$46,482. Smelter production for nine months ended May 31: Lead, 6,040,489 lb.; silver, 140,000 oz.

PRODUCTION OF LEAD.

Published figures show that during five months ended May 31 ores and concentrates containing lead were received at the smelters at Trail and Nelson, as under:

	Lb. of Ore.	Lb. of Lead.
Trail smelter	13,904,836 containing	6,301,670
Nelson smelter	10,783,977 "	4,728,817
Totals	24,688,813	11,030,487

The lead ore smelted at the Sullivan Company's smelter at Marysville, East Kootenay, during the same period was approximately 26,000,000 lb., but no information has been made public as to the lead contents.

CONSTRUCTION NOTES.

The reconstructed Montezuma concentrator, on the south fork of Kaslo Creek, is in operation and its first product has been shipped.

At Pine Creek, Atlin, J. M. Ruffner's steam ditcher machinery, weighing about 30 tons, has been received and placed on a scow. More labourers are required to operate this plant.

Work has been commenced to further increase the capacity of the Granby Consolidated Company's smelting works at Grand Forks. A. B. W. Hodges, local manager, states that the eight furnaces are to be lengthened, thereby increasing the total smelting capacity by about 1,000 tons daily and making the maximum treatment capacity of the works about 4,500 tons a day. The enlargement of the furnaces will be spread over about a year, so as to keep most of them in blast while the work is in progress.

Surveys have been ordered by M. M. Johnson, consulting engineer and managing director of the Dominion Copper Company, for an aerial tramway it is planned to construct from the company's mines at Phoenix, Boundary district, five miles down to its smelter at Boundary Falls. Continued shortage of railway cars necessitates other provision for conveyance of ore to the smelter, the treatment capacity of which is now 1,200 tons daily.

The Babcock & Wilcox boiler in the new power-house

of the Diamond Vale Coal and Iron Mines, Ltd., Nicola district, is now bricked in and cemented, and will soon be under steam.

On April 25 an upright engine, pump and hoist were loaded at Ashcroft for Barkerville. This machinery is to be installed in the shaft house of the Slocan-Cariboo Mining and Development Co.'s property on Canadian Creek, Cariboo.

The charcoal iron smelter at Irontdale, near Port Townsend, Washington, U. S. A., has been renovated, some 60 men having been employed in reconstruction work and the installation of new plant and machinery. It is planned to resume iron-smelting operations, after a shut-down of several years, early in July. The greater portion of the ore (magnetite) to be smelted will come, as before, from British Columbia. Bog iron will again be obtained from Skagit county, Wash. Jas. A. Moore of Seattle, Wash., is at the head of this enterprise.

TRADE NOTES AND CATALOGUES.

The Westinghouse Storage Battery is dealt with in a booklet published by the Westinghouse Machine Company of East Pittsburgh, Pennsylvania, U.S.A., which company announces its preparedness to contract for complete storage battery installations for any class of service. Information is given relative to the plate, positive and negative; boosters, regulators, and switchboards; and portable batteries. Numerous illustrations add to the usefulness of this publication.

The Canadian Rand Company's little booklet on compressed air appliances briefly notices Rand air compressors, "Imperial" pneumatic tools and motor hoists, Rand trolleys, air hoists, and the Rand "Little Giant" drill. Short descriptions of all these air appliances, together with illustrations of the various machines and devices, make a handy little booklet. Full information and quotations are obtainable from any of the company's branch offices or from its executive offices in Montreal, Quebec.

"The Care of Electric Mine Locomotives in Service" is the title of Bulletin No. 12 issued by the Jeffrey Manufacturing Company, of Columbus, Ohio, U.S.A. The 80 pages contained in this well-printed bulletin are replete with information and instructions regarding the care and operation of electric mine locomotives, and with half-tones illustrating many phases of this subject. The work has been prepared with a view to its being of practical assistance to users of these locomotives, and to those requiring general instructions for their care and operation, and brief descriptions of their equipment, will be found especially helpful.

From the Canadian Westinghouse Company, Ltd., of Hamilton, Ontario, have been received three more publications, viz., Circular No. 1118, "Westinghouse Type CCL Polyphase Induction Motors"; special publication No. 7023, "Points for Consideration when Purchasing Series A.C. Arc Lamps," (a paper by G. Brewer Griffin before the Ohio Electric Light Association Convention at Sandusky, Ohio, U.S.A.); and "Westinghouse Fan Motors." The last-mentioned is a most artistic production with a cover that is a striking example of successful colour printing, and many pages of representations, in beautifully finished tints, of fan motors in position in buildings and other places in which these essentials to comfort in summer are in effective use.

The American Spiral Pipe Works, of Chicago, Illinois, U.S.A., has published an illustrated catalogue showing in great variety forged and rolled steel pipe flanges and other manufactures, accompanied by tables of dimensions, prices, etc.

From Nelson come information that the Canadian Metal Company of that city is installing at its newly built concentrating mill at the Blue Bell mine, opposite Ainsworth, Kootenay Lake, a number of Wilfey concentrating tables. Mussels Limited of Montreal, Quebec, sole Canadian agents for this improved concentrator will be pleased to give full particulars and to send their Bulletins Nos. 21 and 22, which contain complete details of the tables and indicate special points well worthy of consideration by those requiring concentrators.

BOOKS, ETC., RECEIVED.

American Institute of Mining Engineers.—Bi-Monthly Bulletin of the American Institute of Mining Engineers, No. 15, May, 1907.

Canadian Mining Institute.—Advance proofs of numerous papers presented at the annual meeting held in Toronto, Ontario, March, 1907. These will form part of Vol. X of the "Journal of the Canadian Mining Institute."

Department of Public Works of Ontario.—"Eleventh Annual Report on Highway Improvement, Ontario, 1907." An illustrated report giving much information concerning the improvement of public highways in Ontario. By A. W. Campbell, deputy minister of public works. Pages, 104.

Hill Publishing Company, New York City.—"Hydrometallurgy of Silver, with Special Reference to Chloridizing Roasting of Silver Ores and the Extraction of Silver by Hyposulphite and Cyanide Solutions." By Ottokar Hofmann, mining and metallurgical engineer. Pages, 328; illustrated. (For review).

BOOK REVIEWED.

Principles of Copper Smelting, by Edward Dyer Peters, professor of metallurgy at Harvard University. 560 pages, 6½x8½ in.; illustrated. Published by Hill Publishing Company, London and New York. Cloth, \$5 postpaid.

This book should prove of more than ordinary interest to metallurgists and students in British Columbia since several of the former, well known in the Province, were under the author, Professor Peters, years ago, when they were gaining practical experience at a smelting works of which he was then in charge. Wm. F. Robertson, now provincial mineralogist; Paul Johnson, who built and operated smelting works at Nelson and Greenwood, respectively; Thos. Kiddie, who designed and operated the Tyee Copper Company's works at Ladysmith, Vancouver Island; and Robert R. Hedley, until lately manager of the Mall Mining and smelting Company's lead-silver smelter at Nelson—all will bear testimony from personal knowledge that this distinguished author is no mere theorist, but, on the contrary, is fully qualified from long years of practical experience to discuss the principles of copper smelting.

Dr. Peters' former book, "Modern Copper Smelting," the value of which successive editions have proved, was devoted primarily to the *means how*; the new book, "Principles of Copper Smelting," is not a revised and enlarged edition of the former, but is a work which gives the *reasons why*. The old book described furnaces and methods, but not the reasons—the practice, not the principle. New plants and new methods are given in the new book, and the old ones reviewed as examples, but Professor Peters, in the main, is concerned with the metallurgical chemistry of copper as applied to commercial conditions. It is by no means abstract chemical theory, but a boiling down of principles for the use of those who would better their metallurgical practice.

It should be mentioned that, as the author states in his preface, the book is written, in part, for students; and, as there are many persons who would like to gain some insight into the smelting of copper, but who have not the training which is requisite for the understanding of ordinary metallurgical treatises, Professor Peters explains that he has tried to write in such a manner that it might be reasonably intelligible to those who have no exact knowledge of chemistry.

Among the noteworthy features of the book in addition to the varied and comprehensive work of the author are the subjects of "Pyrite Smelting," largely written and entirely reviewed by Mr. Robert Sticht, general manager of the Mount Lyell Mining and Railway Company, Ltd., with large copper producing works in Tasmania; and "Applications of Thermochemistry," written by Mr. Joseph W. Richards, professor of metallurgy, Lehigh University, Bethlehem, Pennsylvania, who is an acknowledged authority in this department.

A chapter on miscellaneous and chemical facts and formulas concludes the book, which is completed by an alphabetical index of 41 pages.

HADFIELD'S PATENT STONE BREAKER AND ORE CRUSHER.

The British Columbia Copper Company, Ltd., has installed at its Oro Denoro mine, in Summit camp, Boundary district, a Hadfield's patent stone breaker and ore crusher, with solid cast steel frame and fitted with jaws and other wearing parts of Hadfield's patent "Era" manganese steel. This machine was made by Hadfield's Steel Foundry Company, Ltd., East Hecla Works, Sheffield, England, and was supplied by that manufacturer's sole Canadian agents, Peacock Bros., engineers, of Montreal, Quebec. It is described as being "specially designed to minimize the risk of breakages, to remedy defects and faulty design associated with ordinary breakers of this class, and to give a maximum output with minimum wear of crushing faces and other wearing parts." It is of the type that has long been the standard for breaking stone. Briefly the stone is broken between the fixed and movable jaw plates, the latter plate being actuated by a powerful toggle movement communicated to it from the driving pulley through the eccentric shaft and the pitman.



The adjustment is accomplished in the usual way, i.e., by simply raising or lowering the adjusting wedge by means of the adjusting bolts, which varies the position of the adjusting toggle block and thus makes a corresponding variation in the distance between the crushing jaws. In this breaker all unnecessary levers, arms and joints have been carefully avoided, the maker being convinced that one of the most essential features of a stone breaker is simplicity.

The dimensions, capacity, etc., of the machine supplied to the British Columbia Copper Company are as follows: Size of receiving opening, 24x19 in.; output per hour based on hard limestone to 2½-in. ring, 16 to 24 tons; approximate weight of heaviest piece (frame), 11,200 lb.; approximate total shipping weight, 27,000 lb.; extreme dimensions (including shafts)—length 8 ft. 2 in., breadth 6 ft. 10 in., height 7 ft. 2 in.; size of driving pulley, 36 in. dia. x 12-in. face; r.p.m. 250; effective h.p. recommended, based on hard limestone to 2½-in. ring, 50. The company expects to have this crusher at work by the middle of July and that it will do good work. Hadfield's steel jaws, car wheels, etc., bought through Peacock Bros. previously, were found so satisfactory that it was decided to give a trial to one of the ore crushers from the same manufactory.

Between 9,000 and 10,000 men are employed in direct connection with the mining and smelting industries of British Columbia. Nine-tenths of these are white men.

F. A. Wilkenson, of the United States Geological Survey department, is spending his holidays in Crow's Nest Pass district. The *Fernie Free Press* states that he is waiting until high water subsides to go up the Elk River to examine the property of the National Coal and Coke Company, in which he is interested. The property will be re-surveyed this summer and Crown granted. It is confidentially expected by interested persons that a railway will be built up the Elk within 18 months when the National Coal and Coke Company, the Imperial Coal and Coke Company and the Canadian Pacific Railway Company will develop their respective coal properties on a large scale.

MINE, MILL AND SMELTER.

J. Anste Bancroft of Montreal has been looking over mining properties in the Ashcroft district.

J. J. Campbell, general manager of the Hall Mining and Smelting Company, Ltd., has returned to Nelson from a business trip to eastern Canada.

Dr. James Bonar of the British Civil Service commission has been appointed deputy master of the Royal Mint about to be established at Ottawa, Ontario.

Frank A. Ross, general manager of the Daly Reduction Company, has returned to Hedley, Similkameen district, from a business visit to the company's head office in New York.

Ex-Judge Alexander Henderson of Vancouver, has been appointed commissioner of Yukon Territory, Canada, in succession to W. W. B. McInnes, who resigned last winter.

F. X. Gosselin of Dawson has been appointed gold commissioner for Yukon Territory, in place of E. C. Senkler, appointed legal adviser for the Yukon.

W. D. Matthews of Toronto, Ontario, president of the Consolidated Mining and Smelting Company of Canada, has been visiting the company's mines and smelter in the Kootenay.

J. M. Turnbull of Trail was at Frank early in June to examine the Hilest Coal Mining Company's coal property in that neighbourhood.

S. M. Moore of Frank, Alberta, general manager of the Canadian-American Coal and Coke Company, Ltd., lately made a business trip to Winnipeg, Manitoba.

Paul Johnson, metallurgist, left Seattle during the first week in June for Sweden where he will probably stay for several months.

R. J. McPhee, manager of the Ottawa mine, Springer Creek, Slovan City mining division, has been compelled to go to a sanatorium for treatment for rheumatism.

O. B. Perry has been visiting the Guggenheim hydraulic gold properties in the Cariboo district. He was accompanied by Prof. John F. Newson of Stanford University, California.

F. C. Laird, manager of the Willow River Mining Company, left Barkerville, Cariboo, on June 21 on a business trip to Chicago. He is expected to return before the end of July.

Leslie Hill of Nelson, consulting engineer to the Hastings (B.C.) Exploration Syndicate owning the Arlington gold mine at Erie, Nelson mining division, lately spent several days in Victoria.

H. H. Claudet of Rossland, representative of the Elmore Vacuum Oil Process, recently visited Victoria and Vancouver, going thence to Golden, in which latter district he will shortly install a Vacuum Oil Process plant.

J. A. Whittier, manager of the Goodenough Mines, Ltd., has returned to British Columbia after having wintered in California. He will shortly commence the season's mining on his company's Grey Copper mine, Slovan.

Capt. J. Argyll, manager of the Iron Mask mine, Kamloops, has returned from England. A smelter is to be erected in connection with this mine as soon as the necessary plant and machinery can be obtained from the manufacturers.

Thomas Kiddie, of Hadley, Southeast Alaska, manager for the Alaska Smelting and Refining Company, was in Seattle, Wash., during June to meet G. D. Mumford, of New York, the new president of the company.

Wm. DeWitt, superintendent of the Fern mine, near Seattle, was injured while he was descending in the ladder in the mine broke while he was descending it; the result was a broken leg for Mr. DeWitt.

Thos. Mills has resigned as mine manager at the Western Fuel Company's No. 1 and Protection Island coal mines, about 16 years.

E. Lindeman, under instructions from the Dominion department of mines, Ottawa, has commenced an investigation of the iron ore resources of Vancouver Island and neighbouring islands.

J. W. Astley, late general superintendent for the Le Roi Mining Company, Rossland, has decided to practise as a consulting mining engineer and has made Victoria his headquarters.

M. R. Galusha of Spokane was in Rossland about the middle of the month. It is understood that it is intended to shortly resume work at the Jumbo mine which Mr. Galusha managed when it was in operation last year.

James Rutherford, at one time in charge of a mining property in the Trout Lake mining division for a Spokane company, has returned to British Columbia from a visit to Scotland.

John D. Hoffman of San Francisco, Cal., and Howard W. DuBois of Philadelphia, Pa., have been examining the Bear Hydraulic Company's gold mining property in the Cariboo district.

Wynn Meredith of San Francisco, Cal., was recently in Vancouver. Some time since he supervised the construction of the Vancouver Power Company's hydro-electric system, the hydraulic end of which provides for 30,000 h.p., but machinery for only 12,000 h.p. has thus far been installed.

Edward Stables of London, England, is at Victoria, awaiting completion of arrangements for the acquirement by the Vancouver Copper Company of the Lenora mine at Mt. Sicker, Vancouver Island, before reopening the mine which adjoins the well-known Tyee mine.

W. M. Brewer lately paid another visit to the Indian Chief group at Sidney Inlet, west coast of Vancouver Island, in company with Mr. Duryee, manager of the Vancouver Island Copper Company which is developing the property under bond and option of purchase.

Geo. Williams, well known as construction engineer at several smelters on Vancouver Island and in the Boundary district, has returned to Victoria from Boundary Falls, where he was supervising construction of additions to the Dominion Copper Company's smelting works.

Herbert Carmichael, provincial assayer and assistant to the provincial mineralogist, has been deputed by the Provincial Government to make a reconnaissance of the country tributary to Alberni, west coast of Vancouver Island. His party includes three assistants for survey and topographical work.

Announcement has been made of the appointment of D. H. Pringle, formerly of the staff of the British American Trust Company, as general manager in Canada for the Galbraith Coal Company, the Alberta Coal and Coke Company, and the Alberta Fuel Company, with headquarters at Calgary, Alberta.

J. Parke Channing who, beside his other appointments is consulting engineer to the General Development Company, left New York on May 29 for the West, on his way to Atlin and the Canadian Yukon. It is understood that while in the northern country he will give particular attention to gold dredging and hydraulicking enterprises.

According to a published report, George J. Walker, of Boston, editor of the *Boston Commercial*, and a well-known authority on copper matters, intends coming West for the purpose of visiting the copper mines and smelters of the Kootenay. During the trip he will also visit the Montana, California, Nevada and Utah copper fields.

G. G. S. Lindsey, managing director of the Crow's Nest Pass Coal Company, Ltd., and Jas. McEvoy, the company's chief engineer, recently went to Toronto, Ontario, to lay before the board of directors plans, etc., of extensive improvements to be made for the enlargement of production and general expansion of business at the company's collieries in southeast Kootenay.

Dr. George W. Maynard after having spent five weeks examining copper properties in the Whitehorse district, Yukon Territory, left for Vancouver on June 19. He intended before returning to New York to visit the Monitor Copper Company's mine, near Alberni, and the Tyee Copper Com-

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pany's mining works at Lethbridge, both on Vancouver Island.

The president of the International Coal and Coke Company has gone east. Before going he announced to John Galvin and J. A. McQuinn of the U. M. W. A., who were in the city, that to secure an agreement for the mine workers, that the mine will remain idle indefinitely.

Professor R. W. Brock of the Geological Survey department of Canada has been employed by the Ontario bureau of mines to make an examination of the Larder lake region in northern Ontario. It has been announced that later in the summer he will join W. H. Boyd in the Lardeau district, where the geological and topographical work necessary to complete the southern half of the Lardeau map-sheet will be taken up where left at the close of the field-work season of 1904.

Dr. Robert Bell of the Canadian Geological Survey has been elected a corresponding member of the Geographical Society of Paris, France. This society was founded in 1821 and is one of the oldest and largest of the geographical societies of the world. It will be remembered that Dr. Bell, who on March 1 last completed his fiftieth year of active official service, was not long ago awarded the Patron's or King's Gold Medal of the Royal Geographical Society of Great Britain, and the Cullum Medal of the American Geographical Society. He had already been honored by King Edward VII. with the Companionship of the Imperial Service Order "for faithful service." The doctor, who after several years as acting director of the Geological Survey Department of Canada last year made way for A. P. Low, is still in active service and will spend the ensuing field work season in geological work in the region north of lakes Superior and Huron, Ontario.

Work has been commenced on the Lehigh Portland cement works, four miles from Belleville, Ontario. The plant, when completed, will be the largest of its kind in Canada.

COAL MINING NOTES

Between the Alberta Railway and Irrigation Company, which owns the Lethbridge colliery, and the United Mine Workers of America representing the men working in the company's mines, there has been a long struggle. The company's miners' union, which it had long refused. The agreement settles wages disputes and the question of eight hours' work at the face in the mine. P. L. Naismith is the company's manager.

H. N. Galer, manager of the International Coal and Coke Company, is reported in the press to have stated that this company's coal mines and coke plant at Coleman, Southwest Alberta, which were closed during recent labour troubles, are again working to present full capacity, which is an output of 1,600 tons of coal a day. Some 1,300 tons of coal are sold daily for steam purposes and the balance of production made into coke which is sold to Boundary, B.C., smelters.

The Alberta Coal and Coke Company is opening a coal mine near Lundbreck. Plans for a plant are being prepared by Chicago engineers. H. N. Galer is manager of this company conjointly with the International company.

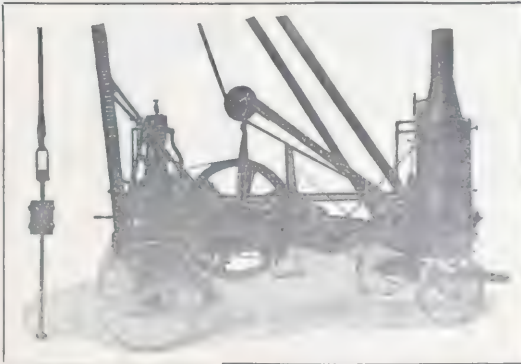
The *Frank Paper* says that the growth of the coal mining industry in Alberta is evidenced by the announcement that seven new local unions of the United Mine Workers of America, are soon to be organized at different points in District 18.

The *Miner* states that at Rossland "considerable coal is coming in from the collieries, including Bankhead, Crow's Nest Pass Coal Company's, Frank, Lethbridge, Coleman and elsewhere. Now that the consumption of coal for household purposes has decreased the mines are being well supplied. The mining companies will take advantage of the situation and lay in surplus supplies for possible emergencies."

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HERBERT B. BROWN,
Hedley, Similkameen, B. C.



SYNOPSIS OF CANADIAN HOMESTEAD REGULATIONS.

Any available Dominion Lands within the Railway Belt in British Columbia, may be homesteaded by any person who is the sole head of a family, or any male over 18 years of age, to the extent of one-quarter section of 160 acres, more or less.

Entry must be made personally at the local land office for the district in which the land is situated.

The homesteader is required to perform the conditions connected therewith under one of the following plans:

(1) At least six months' residence upon and cultivation of the land in each year for three years.

(2) If the father (or mother, if the father is deceased), of the homesteader resides upon a farm in the vicinity of the land entered for, the requirements as to residence may be satisfied by such person residing with the father or mother.

(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

Six months' notice in writing should be given to the Commissioner of Dominion Lands at Ottawa of Intention to apply for patent.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2000 lbs. shall be collected on the gross output.

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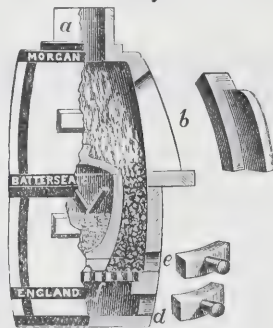
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NOTES AND COMMENTS.

Nelson has sent to the Winnipeg Fair an excellent mineral exhibit. T. G. Procter collected the specimens.

With three furnaces in operation the British Columbia Copper Company, Ltd., is smelting about 2,000 tons of ore a day.

Publication of some interesting news from Mining in North Kootenay, contributed by a correspondent, has had to be deferred until next month.

The machinery has been transferred from the old smelter at Pilot Bay to the new concentrating mill at the Blue Bell mine, opposite Ainsworth.

The value of the gold bullion received at the United States Assay Office, Seattle, Washington, from Canada, during the fiscal year ended June 30, ulto., was \$7,186,385—from British Columbia, \$1,190,548; from Canadian Yukon, \$5,995,837.

"The secrecy and mystery with which the business affairs of the Sullivan Group Mining Company has always been hedged about is now being thrown aside," states the *Cranbrook Prospector*. "The shareholders are much pleased with the new state of affairs, and greater interest is being taken in the future prosperity of the big silver-lead property."

The Spokane, Washington, division of Canadian has had to postpone its intended excursion of 100 to 150 of its employees to the Coast's West Port Coal Company's coal mines and coke ovens near Fernie, B.C., owing to there not being sufficient railway sleeping cars available. A second railway connecting Spokane with these coalfields was lately completed and trade between the two places is being considerably increased.

A sign of returning interest in British Columbia mining operations in England is that the London *Electrician* and *Engineering* publishes cables concerning British Columbia mines under their own black-letter sub-head "British Colum-

bia" instead of under the less noticeable "Miscellaneous." We hope to see other journals publishing mining news give this province similar prominence, now that several of its larger mining companies are on a dividend-paying basis.

Cabled advices from London intimate the declaration of an interim dividend of two shillings per share on its 120,000 £5 shares by the Le Roi No. 2, Ltd.; total, £12,000 (approximately \$60,000). This company distributed £36,000, free of income tax, out of its last fiscal year's profits. This year developments at its mines at Rossland are satisfactory, new orebodies having been opened at the 700 and 900-ft. levels, respectively, and the diamond drill has entered ore of good grade at 317 ft. below the 900-ft. level.

The Yale Mining Company, operating the Nickel Plate mine near Hedley, Similkameen, has adopted the high wages scale known in the interior mining districts as the "Boundary scale." This wages scale went into effect at the Nickel Plate on July 1. Under it miners are paid \$4.00 to \$4.50, trammers and shovellers \$3.50 to \$3.75 (according to class of work) and other employees in proportion. The wages paid at the stamp mill at Hedley are also good. Space restrictions prevent the scale being printed in the MINING RECORD in detail this month, but this subject shall have notice later.

The Consolidated Mining and Smelting Company of Canada, which owns the Trail smelter and large mines at Rossland and in East Kootenay, is extending its holdings in the Boundary district, where for a year it has operated under lease and bond the Snowshoe mine at Phoenix. Recently it secured either by purchase or under option between 20 and 30 claims situated in Phoenix camp, near the Granby Company's mines. On one claim—the War Eagle—a small power plant was installed in 1900 and some development work done on the 100-ft. level, but no ore has been shipped from any of the claims.

The Portland Canal section of Skeena mining division is now producing copper. The report of the provincial bureau of mines, lately issued, shows a production in 1906 of 293,269 lb. of copper as against none in 1905 and only 17,407 lb. from the whole division in all previous years. Last year's output was practically all from the Outsiders' mine of the Brown Alaska Company of Seattle, Washington, which has this year (1907) considerably increased its production. Its ore is smelted at the Alaska Smelting and Refining Company's smelter at Haidley, southeast Alaska, and the resulting matte converted into blister copper at Tacoma, Washington.

Owing to the high rate charged by express companies, miners in Alaska have this year been send-

ing gold to Seattle by registered mail. One steamer which reached that city lately from the North brought about \$600,000 in gold sent by mail. In order to comply with the postal regulation requiring that packages thus sent shall not exceed 4 lb. in weight, the gold has been sealed in cans of that weight and registered. It is stated that the steamship company having the mail contract will probably decline to carry it out, preferring to forfeit its \$10,000 bond rather than continue incurring the great risk of carrying such large quantities of gold as registered mail.

Money prizes totalling \$1,250 will be offered for two rock drilling contests to be held at the Spokane Interstate Fair, Spokane, Washington, which will be open September 23 to October 5. For a double-hand contest the prizes will be: First, \$500; second, \$250; third, \$150. For a single-hand contest: First, \$250; second, \$100. Entries which will close September 23, are expected from Washington, Oregon, Idaho, Montana, Colorado, and British Columbia mining camps. Several trophy cups (including one of \$100 value), cash prizes and diplomas will be awarded for camp and district mineral exhibits. More space will be allotted for mineral exhibits than at any previous Spokane fair, with the object of adequately demonstrating the importance of the mineral resources of the northwestern states and southeastern British Columbia.

It is expected there will be at least nine gold dredges operating in the Yukon this season, viz., the Canadian Klondike Mining Co.'s electrically operated dredge with a capacity of 3,000 cu. yd. per day, working on the Boyle concession; the Bonanza Basin Gold Dredging Co.'s steam driven dredge, stated capacity 3,750 cu. yd. per day, working near the mouth of Klondike River; the Lewes River Dredging Co.'s steam dredge, capacity 1,200 cu. yd. per day, operating on Bonanza Creek; Ogilvie Dredging Co.'s steam dredge, capacity 400 cu. yd, working on Klondike River; the Forty-mile Dredging Co.'s dredge, similar to that of the Bonanza Basin Co., working on Forty-mile River; another large dredge to work in the Forty-mile district; and the three big dredges the Yukon Consolidated Goldfields Co. intends operating on its Bonanza Creek claims.

The Yukon Consolidated, a Guggenheim company, has begun work both above and below Discovery, Bonanza Creek, and has made a departure from hydraulic methods heretofore prevailing in the Klondike. The new system involves first the ground-slucing of the creek bottom proper by hydraulic head, then setting sluice boxes in the bedrock, and then hydraulicking down the gravel banks into the bedrock flume, whence it is conveyed to a sump at the lower end of the claim. An endless conveyor belt acting as a tailings stacker carries the water and washed gravel well clear of the creek bed, thus allowing of bedrock being thoroughly cleaned up.

The creek bottom will afterwards be used as a dump for tailings from the mill and bench claims on both sides of the creek. The conveyor and pump are electrically operated, the power being transmitted by pole line from the company's hydro-electric power house on Twelve-mile, about 30 miles distant. Operations are being directed by Chester A. Thomas.

Japanese fishermen fishing off Moresby island of the Queen Charlotte group last year found near the shore "float" copper ore. Prospecting back from what is now Ikeda bay they discovered a strong copper-bearing ledge. The Ikeda Bay Mining Company was formed in Japan and mining operations undertaken. An old stern-wheel steamer has been beached and converted into a camp. Beside sleeping quarters for the company's 86 men, (including officials and resident physician), there are on the steamer an assay office and a small hospital. The company has 13 mineral claims, each named after a Japanese flower, commencing with the Chrysanthemum claim. There is a paystreak of high-grade copper ore in the ledge. About 1,200 tons of roughly sorted ore are awaiting shipment to a Vancouver Island smelter. A wharf 160 ft. long with an L 50x110 ft. has been built and construction of a tramway to the mine is in progress. The success of the Japanese has attracted much attention to Moresby Island which is being extensively prospected and already other promising mineral claims have been located.

At a meeting of members of the Royal Institution for the Advancement of Learning in British Columbia held lately in Vancouver, it was reported that a site for the new college building had been secured from the Government, for a term of years. Under the terms of the lease the society will be required to spend \$150,000 for educational purposes during the first seven years, and during the term of the lease \$150,000 in permanent improvements. It was decided to take immediate steps towards erecting the new building, to cost approximately \$100,000. Up to the present time four chairs have been endowed in part or in whole in the college. The Robert Dunsmuir chair of mining and chemistry by Hon. James Dunsmuir; the chair of civil engineering by Mr. A. C. Flumerfelt; the chair of pure and applied mathematics by Hon. F. Carter-Cotton, and the chair of modern languages by the McGill University graduates resident in British Columbia. The board expressed the hope that in the near future other chairs would be endowed by friends of the institution. A summer school, for instruction in practical mining, is to be established in one of the mining districts of the Province. It is announced that the mining department of McGill University, Montreal, Quebec, will make British Columbia the headquarters for practical mining education for the university mining classes, as well as for local students.

PRODUCTION OF LODGE GOLD IN THE SIMILKAMEEN

THE HEDLEY Board of Trade recently considered it has grounds for complaint against the *Mining Record*. A letter has been received from the secretary as follows:

"In your issue of June, you state that according to the 'Annual Report of the Minister of Mines' the Similkameen, Nicola, and Vernon mining divisions produced in 1906 only 6 oz. of lode gold, value \$124. Now, while this statement is officially correct, your publication of the bare facts has already done this camp and valley a great deal of harm.

"As one of the leading mining journals of this country, we expect fair treatment from you, and thought that if the matter was brought to your attention you would publish the facts, which would correct the wrong impression of the Similkameen Valley created by your June issue.

"Camp Hedley, though situated in the centre of the Similkameen Valley, is included in the Osoyoos mining division and if you will enquire at the Department of Mines, Victoria, you will ascertain what was the production of the Osoyoos division which, in the Minister of Mines Report, is linked with the Grand Forks and Greenwood divisions of Yale district, for reasons we cannot understand. You will then find what the Similkameen Valley produced last year, and every ounce of lode gold of that production can be credited to Camp Hedley.

"By making public such facts you will only be doing that which is fair and just to this section."

The Hedley Board of Trade may rest assured the district it represents, in common with all others in the Province, will always be fairly treated by the *Mining Record* which, as is generally conceded, endeavours to publish facts only concerning the mining industry.

It is unfortunate that a small portion of the big Similkameen district is officially designated the "Similkameen mining division," but of course we are in no way responsible for the adoption and long-continued use of nomenclature which is in a measure misleading. We admit that if it had occurred to us to do so at the time we printed the official statement to which exception has been taken, we would have directed attention to the distinction between the Similkameen "district" and "mining division." If, however, we were required to be always making explanations of this nature there would be practically no end to them. Rossland does not demand that whenever we mention the production of Trail Creek mining division we state that all the ore produced in it is from Rossland mines; Ymir does not hold an indignation meeting to protest against its important production being credited to Nelson mining division; Fernie and Michel, with their big coal mines, and Moyie with the largest lead mine in Canada, do not

claim that great injury is done these camps, respectively, by recording their production as that of Fort Steele mining division; Texada Island does not take strenuous objection to its product appearing under the head of Nanaimo mining division, nor does Howe Sound protest against being included in New Westminster. Yet all these have stronger grounds for protest, if such be necessary, than has Hedley, which, by the way, seems to have been a long while in discovering that an injustice is being done its camp by the continuance of a custom established years before there was even one producing mine in the vicinity of Hedley.

While we are of opinion that changes in names of certain mining districts and divisions can be made with advantage, and in some instances should in justice be made, we think it improbable that, under existing conditions, the department of mines will accede to the evident desire of the Hedley board of trade that the production of its camp shall be shown separately in the published official returns. To do this when there is only a single producing mine in that locality would be, in our opinion, to violate the spirit of the law which while making compulsory the sending in periodically to the department sworn returns as to mineral production, etc., forbids the publication of the information thus obtained. Should there later be several producing mines in that camp, the existing difficulty will disappear; meanwhile, though, we think the government will not be justified in making any change that practically involves the disclosure of the returns of the Yale Mining Company which, if so inclined, may at any time supply the Hedley board of trade with the tonnage and value of its production and authorize publication of same. The Hedley board of trade will speedily ascertain the very proper attitude of the department of mines in this connection if it apply for the particulars it wishes made public, for they will not be supplied by the government.

A few words in conclusion as to a mis-statement made editorially in the Hedley *Gazette*—The *MINING RECORD* did not, as charged, ignore the fact that in 1906 the Nickel Plate mine produced in 1906 35,000 tons of ore. This information was in type last month, but the extract from the "Annual Report" in which it occurs was, with much other matter, unavoidably held over until this month. The *MINING RECORD*, it may be added, is too careful of its reputation for reliability to descend to such tactics as those of the *Gazette* when it takes improper advantage of a similarly misleading designation to that the local board of trade objects to, and thereby makes it appear that Rock Creek and Camp McKinney are in the Similkameen. This we regard as a deliberate attempt to show the Similkameen district, as generally understood, to be entitled to credit for the gold production of a district quite distinct from it. Anyone familiar with the situation will at once admit that Camp McKinney and Rock Creek are not in the Similkameen, and it is the merest quibble to use

the designation Similkameen *electoral district* as warrant for crediting the Similkameen proper with a production made outside of its well recognized limits. Suppose, for instance, we should claim that all the losses of mining enterprises at Camp McKinney—and the editor of the *Gazette* was in charge of one of the several that were decided failures—were evidences of the unproductiveness of mining in the Similkameen, would not the Hedley board of trade strongly protest—and it would be justified in doing so. Does it, then, approve the equivocation of the *Gazette* in the opposite direction? We give it credit for more honesty of purpose. The *Gazette* charges the *MINING RECORD* with "misrepresentation" in quoting what the local board of trade admits to be "bare facts officially correct." What about the "misrepresentation" of the *Gazette*? Is it not deliberately intended to deceive?

CLAY DEPOSITS OF ANVIL ISLAND.

By Herbert Carmichael, Provincial Assayer.*

ANVIL ISLAND is situated up Howe Sound, 23 miles from Vancouver City. It is a granitic peak rising to a height of 2,700 ft., and is three miles long by two miles wide. At its southern extremity there is an extensive deposit of glacial clay, which is being worked by the Columbia Clay Company, Ltd., under the management of J. A. Brownword. The clay bank has an area of some 90 acres and a thickness of about 100 ft. For a glacial clay it is uniform in texture, being practically free from stones. A floor has been run into the bank, slightly above the level of the mixer and brick machine, so that the clay is shovelled into small cars and run by gravity a short distance to the hopper; the brick machine is of the "soft mud" type. The bricks are burned in a continuous kiln, the draught being maintained by a fan and exhausted through a dryer, in which the bricks are dried before being burnt. The kiln is only a few feet from the water, the bricks being loaded direct from the kiln by small cars on to scows, which are towed to market. The plant has a capacity of 30,000 per day.

The following is an analysis of the Anvil Island clay, made by the Provincial Government assay office:

Loss by ignition	3.0 per cent.
Silica	58.6 "
Alumina	26.7 "
Oxide of iron	7.5 "
Lime	4.0 "
Magnesia	Trace.
Fusion point	2,000 Fahr.

The gross output of coal from British Columbia mines in 1906 was 1,899,076 tons of 2,240 lb., or 2,126,965 tons of 2,000 lb. After deducting amount made into coke the net output was 1,517,303 long, or 1,699,379 short, tons.

*In "Annual Report of Minister of Mines" for 1906.

A REVIEW OF PROGRESS IN THE MINERAL PRODUCTION OF BRITISH COLUMBIA.

By E. J. JAMES, Victoria, B. C.

MINERAL PRODUCTION in British Columbia is steadily increasing in value and importance. Its progress during many years to the end of 1906, was the subject of a short paper contributed to the *Journal of the Canadian Mining Institute* as follows:

British Columbia's total mineral production to the end of 1906 is shown by official records to have been \$273,643,000. This production was apportioned as follows:

Placer gold	\$68,721,000
Lode metals	
Gold	\$11,016,000
Silver	25,586,000
Lead	17,626,000
Copper	35,516,000
Iron and zinc	270,000
	<hr/>
	\$120,044,000

Total metalliferous

Coal and Coke	\$72,815,000
Coal	6,520,000
Coke	
	<hr/>
	\$79,335,000

Building materials, etc. 5,543,000

Total non-metalliferous..... \$ 84,878,000

Grand total of production.... \$273,643,000

Reviewing several periods it is seen that from the time of commencement of mining operations in the Province to the end of 1886, the total value of production was \$64,246,000 in the following proportions: Placer gold, \$53,797,000; coal, \$10,449,000. In the ten years, 1887-1896, a total of \$37,809,000 was produced, this consisting of placer gold, \$5,006,000; lode metals, \$8,126,000; coal and coke, \$23,537,000, and building materials, etc., \$1,140,000. For the ten years 1897-1906, the total was \$171,588,000, comprising placer gold, \$9,917,000; lode metals, \$111,979,000; coal and coke, \$45,349,000, and building materials, etc., \$4,343,000. Recapitulating, the production of the respective periods above-mentioned was as follows:

To end of 1886	\$ 64,246,000
Ten years, 1887-1896	37,809,000
Ten years, 1897-1906	171,588,000

Total production, all years..... \$273,643,000

The progress of British Columbia's mining industry is further indicated in the following summary:

PLACER GOLD.

The production of placer gold dates back to 1858, in which year a total of \$705,000 was recovered.

The maximum production in any one year was that of 1893, with a value of \$2,913,000, followed the next year by a total of \$2,600,000. This was when placer mining was at its best in the Cariboo district. In the immediate following a gradual retarding, while through the depression the stream was never checked, continuing into the early nineties. The minimum yearly total was reached in 1893 with a production for that year of only \$336,000. Thenceforward there was a steady increase. The yearly average total recovery during ten years, 1897-1906, was about \$991,700. The total production during 49 years has been in round figures:

Period.	Value.
In nine years, 1858-1866.....	\$23,674,000
In ten years, 1867-1876.....	19,787,000
In ten years, 1877-1886.....	10,336,000
In ten years, 1887-1896.....	5,007,000
In ten years, 1897-1906.....	9,917,000

Total

100,000,000.

The tables of production of lode mines, published yearly in the "Annual Report of the Minister of Mines for British Columbia," show that a commencement was made in 1887, in which year silver and lead to a total value of \$26,500 was produced. The first official record of lode gold was a value of \$23,400 for the year 1893, and of copper \$16,200 for 1894.

Gold.—Out of a total of \$41,016,000 of lode gold, only \$2,178,000 was produced during four years, 1893-1896, but in five next following years, 1897-1901, there was an increase to \$14,984,000 for that period, while still greater progress was made during the five years, 1902-1906, the total for which was \$23,854,000, or an average of rather more than \$4,770,000 a year.

Silver.—Production of silver during ten years, 1887-1896, totalled \$4,028,000, of which amount \$2,100,000 was produced in 1896. For the ten years, 1897-1906, the total was \$21,558,000, with a maximum of \$3,273,000 in 1897, and a minimum of \$1,521,000 in 1903. The total for the whole period reviewed was \$25,586,000.

Lead.—The production of lead during the ten-year period, 1887-1896, was small, having totalled only \$1,581,000. During the next ten years, 1897-1906, an average yearly output of rather higher than \$1,604,000 was maintained, with a maximum value in 1900 of nearly \$2,692,000, and a minimum in 1903 of about \$690,000. The total for this period was \$16,045,000, and the aggregate of production for all years, \$17,626,000.

Copper.—No copper was produced until 1894, in which year a beginning was made, with an output valued at \$16,234. For the three years 1894-1896, a total of \$254,802 is recorded. Thereafter the production for ten years, 1897-1906, totalled \$35,292,000. The output of 1906, valued at \$8,288,000, was by far the highest for any single year since production of this metal was begun in the Province.

Other Metals.—The production of other metals than the foregoing, placed at a total value for all years of about \$270,000, may be subdivided, approximately, as follows: Zinc, \$160,000; iron, \$100,000; platinum, \$10,000. Of these, both iron and zinc are

total value for the whole of that period of only \$666,288. It was not until 1884 that the total for any single year reached \$1,000,000; the recorded value for that year was \$1,182,210. As already shown, the total value to the end of 1886 was \$10,-

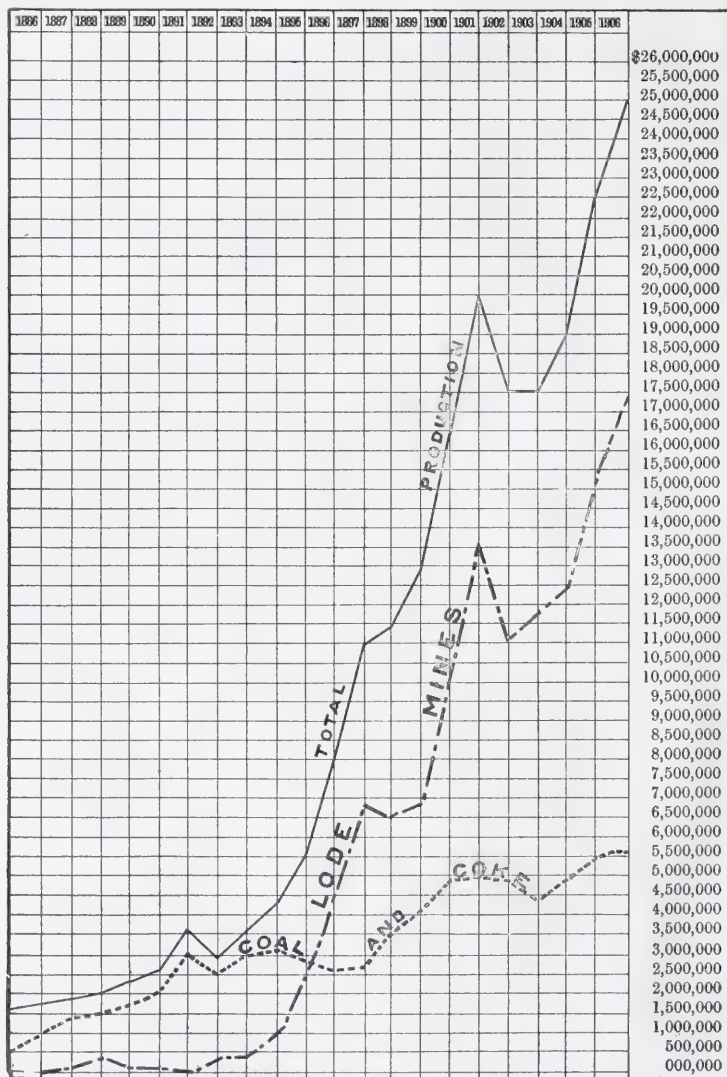


Table showing Progress of Mineral Production in British Columbia.

expected to show increased production in the near future.

COAL AND COKE.

Coal mining appears to have been commenced in 1836, but production must have been small during 30 years to 1865, inclusive, official records showing a

449,000. During the next period, 1887-1896, the production of \$23,537,000 included \$7,825 for coke, the manufacture of which was commenced at Union, Vancouver Island, in 1895. Of the total of \$45,349,000 for coal and coke during the period 1897-1906, the production of the latter was \$6,512,000,

chiefly from the celleries of the Crook's Nest Fuel Coal Company, in southeast Kootenay, at which coke-making was begun in 1898.

BUILDING MATERIALS, ETC.

Building stone and brick, fire-brick, lime, cement, and such carbonaceous as paper and tiles, constitute practically all the non-metallic minerals included under this head. The output from Coast quarries of granite and sandstone for building purposes has considerably increased during the last two years. The production of brick and lime is also on the increase. Portland cement has been manufactured on Vancouver Island since 1904; the output for 1906 was of a value of between \$200,000 and \$300,000, while for the current year the outlook is favourable to a substantial increase. Oil and oil shales are still undeveloped so as yet are not of commercial importance in the Province.

PRODUCTION OF 1906.

Turning now to the mineral production of 1906, which was a record year in the history of mining in British Columbia, it is noteworthy that the total of nearly \$25,000,000 is rather better than 11 per cent. higher than that of 1905, while it shows an increase of nearly 32 per cent. as compared with that of 1904, and nearly 43 per cent. over 1903. As regards tonnage of ore mined, which is of course exclusive of coal, the quantity was about 1,964,000 tons, an increase of 15 per cent. over that of 1905. The number of mines from which shipments were made was 154, but of these only one-half shipped more than 400 tons each, and but 41 in excess of 1,000 tons each. The number of men employed at the metal-liferous was not quite 4,000, and at the coal mines a higher total, together giving an aggregate of between 8,000 and 9,000.

While the higher prices of silver, lead, and copper contributed in large measure to the considerable increase in value of the year's production over that of any other year, there was also an enlarged output of copper, coal, and building materials. Copper especially made a substantial gain in quantity—about 5,300,000 lb. more than was produced in 1905. Coal also showed an appreciably large increase over the production of 1905, and the year's output of 1,517,000 tons was the biggest tonnage ever reached in the Province in any single year.

The causes of decreased production of several of the minerals in 1906 as compared with 1905 were temporary and the reasonable expectation is that they will not similarly affect production in 1907.

As exhibiting the importance of mining in comparison with other staple industries of British Columbia, the following estimate of production in 1906, made at the close of that year, is submitted:

Lumbering	\$ 9,500,000
Agriculture	8,000,000
Fisheries	8,000,000
Together	\$25,500,000
Minerals	26,000,000
Manufactures	11,000,000
Total	\$62,500,000

It will be seen that the estimated total value of the mineral production was about \$1,000,000 in excess of the total production in the several industries (except the fishing industry) in the same year's production only about \$520,000 short of that estimated as the total of the products of lumbering, agriculture and fisheries combined. While this is a decidedly creditable showing for the mining industry of the Province to have made, the immediate outlook is that when the time shall come for a corresponding comparison for 1907 to be made, the mineral production for that year will be found to have reached a still more favourable relative position.

In recent numbers of the MINING RECORD mention was made, first of the appointment of Dr. R. A. Daly to a professorship in the Massachusetts Institute of Technology, and next of Professor Jaggard and party having proceeded to the Aleutian Islands for purposes of scientific study. The April-May number of *Economic Geology* contains the following information relative to those scientists and their work: Dr. Reginald Aldworth Daly has been appointed professor of physical geology at the Massachusetts Institute of Technology, the appointment to take effect October 1, 1907. Professor Daly has completed six seasons of field work as geologist of Boundary surveys at Ottawa. He has only the office work to finish. In Boston he will teach dynamical and physiographical geology to classes of mining and civil engineering students. He will also offer research courses in the physical geology of the igneous rocks and in oceanography. Dr. Daly's coming to Boston is part of a movement at the Massachusetts Institute to establish a research laboratory of physical geology, directed by T. A. Jaggard, Jr. Funds for the purchase, installation and maintenance of seismographic apparatus have been subscribed. The laboratory will deal primarily with the direct measurement and record of earth movements and processes. Professor Jaggard will inaugurate the research work of the laboratory by an expedition to explore the Aleutian Islands. The exploration is financed by Boston men. The scientific party includes Professor Jaggard as geologist, Prof. H. V. Gummere of the Drexel Institute as astronomer, a physician, a mining engineer, and two student assistants. The main object of the scientific work is the study of Aleutian volcanoes, and some attention will be given to magnetism. Travel will be by schooner from Unalaska to Attu and return. The volcano on Akutan was reported active about March 15, and a new extension of Bogoslof rose from the sea in 1906, according to authentic reports.

The *Mineral Resources of the Province* (1906) indicates a big increase in the consumption of sheet mica during the past year, in the United States. The imported mica comes from Canada and India, this country taking about one-half of the output of the Canadian mines. Ground mica, of Canadian origin, is not imported on account of the tariff."

DEVELOPMENTS OF THE YEAR.

MINING DEVELOPMENT in the Province in 1906, though in a large measure satisfactory, exhibited no very striking features. Coal mining has notice elsewhere. The official review of the year's metal mining follows:—

PLACER MINING.

In placer mining a departure has been made in Atlin, from the methods formerly in vogue, in the installation of the first properly equipped steam shovel, with apparently satisfactory results. In Cariboo, the long-preached axiom that the quantity of water available for hydraulicking is the measure of the output, has had the effect of starting extensive plans and works for rendering available considerably more water, the effect of which on the production will not be noticeable for a couple of years.

Dredging in Atlin has proved a failure, owing to the character of the gravel rather than the scarcity of gold. Dredging on the Fraser and its tributaries has not proved successful, for various reasons.

Individual placer mining is decreasing to such an extent as to be now relatively unimportant.

LODE MINING.

The enlarged production of the lode mines of the Province in 1906 was entirely due to the increase in the market price of metals, together with the effect this had in stimulating the output of copper ore in the Boundary and Coast districts.

The chief product of the East Kootenay district is silver-lead ore, of which practically all is obtained from two or three mines in the Fort Steele mining division. Here, although the amount of lead produced in 1906 was 3,761,347 lb. less than in 1905, the former year's production was more than double that of 1904. Despite the decreased production, the market price was so much higher as to make the value of this year's diminished product greater than was that of last year. The same is true of the silver product. The quantity of ore handled this year increased by about 10,000 tons. Fort Steele mining division produced about 85 per cent. of the total lead output of the Province. The North Star Company again began to ship a considerable quantity of ore from one of its properties.

In the Windermere mining division some six mines shipped during the year, but did not average 50 tons each.

In the Nelson mining division the tonnage of ore mined was about the same as in 1905, but, owing to the closing of the Ymir mine, the production of gold decreased, while the copper output more than doubled. Several of the smaller properties in the division were energetically and successfully operated.

In the Slovan district some 52 mines shipped ore about the same number as in 1905 but of these only 16 produced more than 100 tons each during the year. During the year the metallic content of the ore was only about half what it was in 1905, or one-

quarter of 1904. This great decrease is partly attributable to the fact that in 1906 there was no market for zinc ore, which is a by-product in the mining of galena. Neither the Dominion Government bounty nor the high price of the metals seems to stimulate the lead industry in this district.

In the Rossland camp there was a decrease in the tonnage of ore mined of 15 per cent., with a somewhat greater decrease in gold and copper contents.

In the Boundary district, despite a shortage of coal and coke for about two months, there was an increase of some 22 per cent. in the tonnage of ore mined. The value of the gold product increased about 19 per cent.; of silver, about 18 per cent.; and of copper, 44 per cent. The value of the copper product in this district was nearly 75 per cent. of that of the whole Province.

In the Coast district, on Texada Island, the Marble Bay mine has maintained regular shipments, while the Copper Queen and Van Anda properties have again begun to ship, although in small quantities. The iron mines have not been operated.

In the New Westminster district the Britannia mine has been in operation, but on account of troubles with the aerial tramway, and difficulties encountered in the concentration of the ores, has not been so successful as it was hoped it would be. There were mined, however, during the year about 90,000 tons of ore, of which some 35,000 tons were shipped direct to the smelter and about 55,000 tons were concentrated, producing nearly 10,000 tons of concentrates. The metallic contents of the ore mined were, approximately, 2,800 oz. of gold, 4,500 oz. of silver, and 2,600,000 lb. of copper. The smelter operated by this company, situated at Crofton, has been in operation during the year on Britannia ore, supplemented by ores from Alaska and from the Portland Canal.

The Portland Canal district has at least partly fulfilled its promise of last year, and during the latter part of this year has been shipping to the smelter at Hadley, Alaska, from one mine, about 100 tons of copper ore a day.

In the Omineca mining division, on the headquarters of the Telkwa and Zymoetz Rivers, a number of prospects are being developed which have good surface showings, chiefly copper ore. These will, however, be too remote from transportation to be available until after the Grand Trunk Pacific railway shall be built.

On Vancouver Island, the Tyee mine shipped some 24,000 tons of ore, containing 1,800,000 lb. of copper, in addition to gold and silver values. The development of the lower levels of the mine has been continued regularly, but has so far failed to disclose any important ore bodies. From the Richard III. mine shipments of ore have again been made this year from a big shoot of ore that is a continuation of the Tyee ore body. A shipment of almost 100 tons of copper ore was made from the Southern Cross mine, on Alberni Canal. Active development has again been begun on the copper properties at Sidney Inlet on the West Coast of the Island.

METALLIFEROUS MINING ON WEST COAST OF VANCOUVER ISLAND.

Notes of Various Island Mining Properties.

ON VANCOUVER ISLAND metalliferous mining has not yet been found profitable in an important degree except, perhaps, in the case of the Teco mine at Mount Steller. There are, however, numerous mineral claims in various parts of the island and among them some which de-

Report of the Mining at Masset in 1906 for the information that follows. Most of the engraving blocks used in illustration have been occasionally lent by the Bureau of Mines.

The west coast of Vancouver Island was visited last summer by the provincial assayer who reported as follows:

JUNE GROUP.

June Group.—The provincial assayer visited and reported on the properties in the vicinity of Quatsino in 1906, since which time the only pro-



Old Harbours, on West Arm of Quatsino Sound, Vancouver Island.

perty, though generally not extensive, has shown to be so promising as to warrant a considerable outlay on further exploration of their mineral resources. Several of these latter are being worked, and it is probable they will ere long be steadily producing and shipping ore to one or other of the Coast smelters.

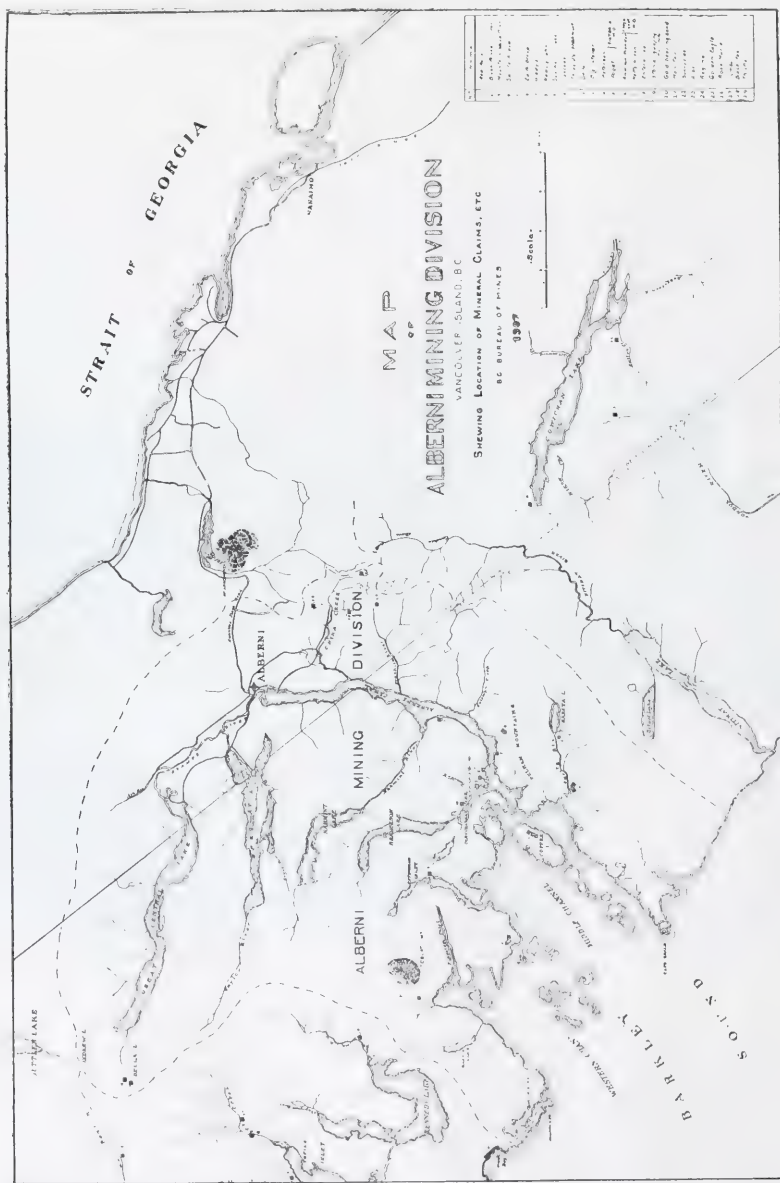
Not much reliable information of quite recent date relative to mining operations on the west coast of Vancouver Island is readily available, consequently, since it is not practicable for the MINING RECORD to obtain later particulars, except in a few instances, recourse has been had to the "Annual

property upon which any important development work has been done is the June Group, situated a few miles back from the north shore of the south-east arm of Quatsino Sound. As was then noted there was on this property a marked mineralized zone, occurring as a ridge, shown up for a length of 300 ft. This showing had then been produced by a series of open cuts and gave promise of the probable finding of an orebody. Last year the owners determined to do some development work on the property, to demonstrate at a depth the promise given by the surface showing, and started a long cross-cut

tunnel. This work has been done under the charge of Harold Grant, of Victoria.

Yreka.—The Yreka mine, which was being worked

posit, noted in 1903 Report as situated on the west arm of Quatsino Sound, has been further prospected by small open cuts and test pits, with results that



in 1903, and was then fully reported on, has since that date lain idle and no further development has taken place.

Hematite Iron Ore.—The hematite iron ore de-

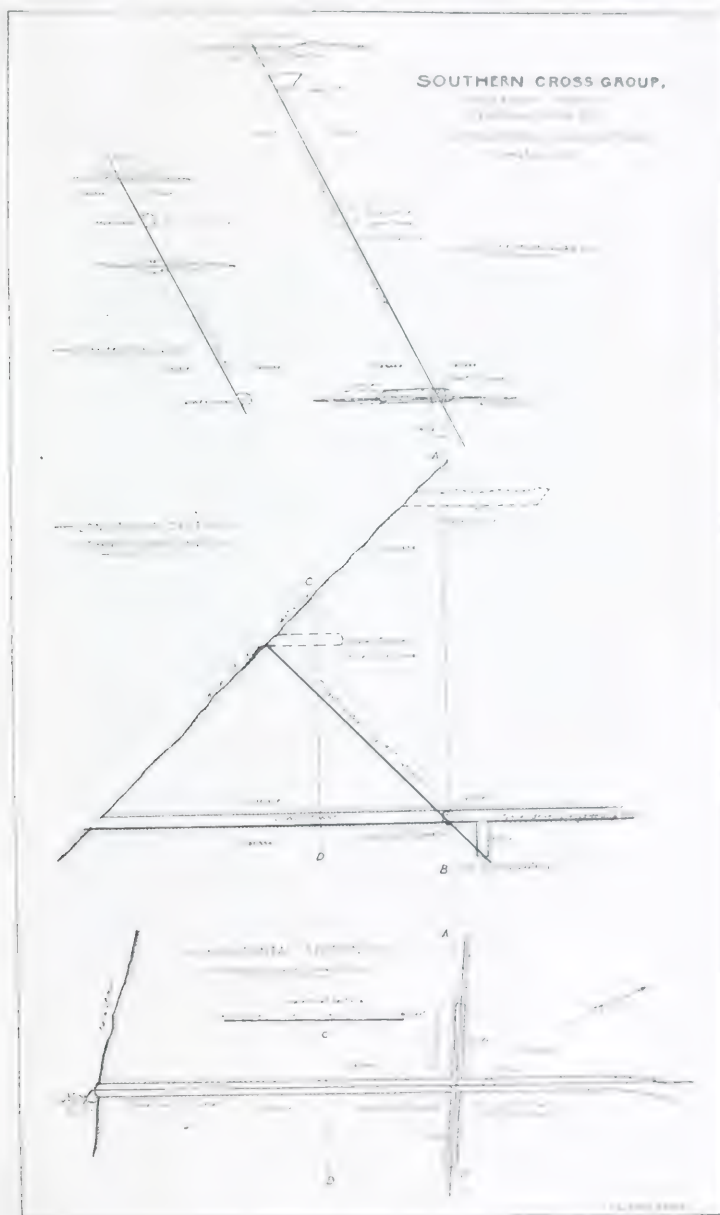
appear satisfactory to the owners. It is understood that the property has been under bond to a syndicate which contemplates the making of iron at Irondale, Washington, but, as far as can be learned, no ore

has been mined or shipped from the property.

On some of the other claims within the district tributary to the sound some little work has been done.

STUQUE SOUND AND TAPASCO HILLS

Kyapine Sound and Tapasco Hills are in the south of Quilmaso Sound, on the west coast of the



but it has been in each case limited to the amount of assessment necessary to hold the property.

island. These claims were prospecting to a certain extent some three or four years ago, but no ore show-

ing warranting further prospecting was found.

NOOTKA SOUND.

Nootka Sound lies to the south of and adjacent to Esperanza Inlet.

Marble on Deserted Creek.—An attempt is being made on the shore of Deserted Creek—an arm of Nootka Sound—to develop a marble quarry, which is particularly interesting, as previous similar attempts on other parts of the Coast have shown the deposits worked to be so fissured by the proximity of igneous rocks, developed locally, as to be of no value commercially.

Deserted Creek is an arm some $2\frac{1}{2}$ miles long by about half a mile wide, running in a northwesterly direction, and has a depth of 40 fathoms of water at its mouth, gradually shoaling off to 14 fathoms at its head. From the water's edge the mountains rise abruptly to a height of over 1,000 ft., leaving little or no land anywhere along the shore.

At the mouth of the creek or inlet the country rock is syenitic granite, but about a mile up the inlet this gives place to a highly crystalline limestone or marble, which has been traversed in places by diabase dykes, varying in width from a few inches to one that measured 45 ft. across. These dykes seem to be more silicious on the western side of the inlet than on the eastern.* On the east side this limestone formation extends for $1\frac{1}{2}$ miles to the head of the inlet, rising to a height of several hundred feet and showing out strongly in great massive bluffs.

This entire mass of limestone has been rendered highly crystalline, probably by the great quantity of igneous rocks which surround and traverse it. While it has become crystalline, the crystallization varies greatly in character, and it would appear, from close examination, that along the contacts of the limestones with the dykes the crystallization is fine-grained, while farther away from the influence of the dykes the crystalline form is much coarser—in some places, very coarse. The original bedding of the limestone has been so completely obliterated by the metamorphism to which it has been subjected that no definite idea could be formed as to the strike of the beds, although this appeared to be N.E. and S.W., with an equally indefinite dip seemingly to the east.

The deposit on the east side of the inlet has been taken up by J. Hastie *et al.*, while that on the west side is held by J. Mortimer.

There is on either side of the inlet undoubtedly an extensive deposit of crystalline marble, of great

purity and good quality, but as to whether this deposit will produce a commercial product—that is, solid, flawless slabs of commercial size—it is as yet impossible to say definitely, since no work has been done to open up quarries, and only a few shots have been blown out of the surface exposures to test them.

While, undoubtedly, in a number of places, the deposit has been considerably shaken and fissured yet there are indications leading to the belief that there are several spots which have not been so affected, and where quarries may probably be opened up and blocks of even large size obtained, free from flaws or shakes.

The colour of the marble on the east side is somewhat variable, but it is generally a blue-gray, becoming darker towards the northern end of the inlet.

On the west side of the inlet, while the extent of the deposit is not quite so great as on the east, the texture is finer and the colour is good, varying from a pure white to gray, while at several spots it presents a mottled face—white with gray streaks—from which it would seem from surface indications as if blocks of considerable size might be obtained.

If the properties prove upon subsequent development to be workable, as the present exposures indicate, they are admirably situated as regards transportation, being right on the shores of a deep navigable inlet, well sheltered from storms or rough water.

Stormont, Glengarry and Texas.—These mineral claims form a group owned by Stockham, Grant & Dawley of Victoria and Clayoquot, situated at the upper end of Head Bay, an arm of Nootka Sound, and distant half a mile from the water. At an altitude of 350 ft. above the sea some surface stripping has uncovered a body of magnetic iron ore, that appears to be of considerable size. The best exposure is a bluff more than 40 ft. high and uncovered for a width of 100 ft., in which exposed face the magnetite seems to be solid and unmixed with rock matter. At this point the ore has been partly stripped for a further distance of 200 to 300 ft., while it is said to have been traced through the three claims. The mineralization appears to occur along the contact of a felsitic, igneous rock with a limestone, but sufficient work has not been done for any definite ideas being formed of the dip or strike of the ore-body or of its general character. An analysis of an average sample gave the following result: Iron, 66.42 per cent.; sulphur, 0.26 per cent. The property is most favourably situated for cheap mining, and a railway two miles long, with easy grade, would give a means of conveyance for the ore to a sheltered bay with navigable water.

HESQUIAT HARBOUR.

Hesquiat Harbour is the next inlet to the south of Nootka Sound, and was visited by the provincial assayer in 1902, since which time no new developments have been made further than assessment work performed on the Brown Jug group, owned by Norris & Smith, of Alberni, and situated on the east side of Hesquiat Lake. The ore is reported to be zinc blende, carrying 20 to 25 oz. of silver to the ton.

*The following is the report of Dr. J. A. Dresser, of Montreal, on a microscopic examination of this dyke rock, taken from western side of the inlet:—

"No. 4,004.—Dyke Rock, Deserted Cove.—This is a yellowish green rock of fine, even texture. In the thin section is found to consist essentially of feldspar, augite, quartz and hornblende, with accessory amounts of some iron ore and shreds of leucoxene. The feldspar is plagioclase, well crystallized; augite, which in amount is nearly equal to feldspar, is of the later crystallization than many parts of that mineral; at least several interstitial spaces are filled with quartz; hornblende occurs in rather small brown crystals, somewhat chloritized. The rock is a quartz diabase."

SIDNEY INLET.

Sidney Inlet is about 10 miles southeast from Hesquiat Harbour, and 12 miles north of the Indian village of Ahousat. This camp was visited in 1899 by the writer; since that time considerable development has taken place on both the Indian Chief and Prince groups of claims, and some ore has been shipped.

Neither of these claims was being actually operated, and there was no one on the ground to serve as a guide, nor could one be obtained. However, an attempt was made to find the various workings by following up the old trails; but as trails in this part

the hills rise to a height of more than 2,000 ft. The main camp is at an elevation of about 1,000 ft.; the principal workings are farther up the mountain, and are reached by short trails from the main trail from the beach, which is one mile long. Over this about 100 tons of ore have been packed down to the beach and shipped thence to the Crofton smelter, yielding returns of 37 per cent. assay. The camp buildings consist of a cabin and stable on the beach and a good bunk-house up the hill.

Prince Group.—The Prince group, consisting of eight claims, Prince No. 1 to 8, is situated to the north of and adjacent to the Indian Chief group.



Upper Tunnel at Southern Cross Mine, Alberni Canal, Vancouver Island.

of the country become rapidly obscured by the rank underbrush and moss, the result was not satisfactory, as only three of the numerous openings could be found. This is to be regretted, as from reliable authority it is known that a number of new exposures of ore have been uncovered, which the owners consider very promising.

Indian Chief.—This group, consisting of nine claims—Firefly, Leschi, Brutus, Mephistopheles, Scotlet, Victor Fraet, Victor, Dewdrop Fraet., and Tinnicum—is owned by Hon. Edgar Dewar, of Victoria. The property extends from the shore of Sidney Inlet back some 6,000 ft., in which distance

The occurrence and character of the ore are similar. This is a group which was obtained and developed for a Scotch syndicate by Dr. T. R. Marshall, now of London, but since his departure from the Province, in 1904, the claims have remained idle.

The Prince and Indian Chief groups use the same trail from the beach for a distance of 2,200 ft., when the trail forks, the right-hand branch going to the Indian Chief and the left-hand to the Prince group, this latter being situated some 7,000 ft. from the landing wharf.

AHOUSAT.

Ahousat is an Indian village situated on a sheltered

bay, Matilda Creek, making in on the east side of Flores Island, and is a regular port of call for the coasting steamers. There is a store here owned by W. Dawley of Clayoquot, where the more ordinary supplies can be obtained.

Ormond.—The Ormond is a claim owned by G. Beck and Gardhouse, of Ahousat, and situated about a mile back from the west shore of Matilda Creek or arm. At an altitude of some 950 ft. some blasts have been fired, breaking a few feet into an exposure of magnetite iron ore, showing here for a width of 3 or 4 ft., and occurring in epidote and diabase.

A little farther to the west and at about the same

tain spots ran as high as 6 or 7 per cent. copper. Some 75 ft. vertically and 150 ft. horizontally back from the second tunnel several shots have been put in on a rock exposure showing mineralization with pyrrhotite and copper pyrites.

A little to the south of and at 400 ft. lower elevation than the Ormond there occurs in a basic eruptive rock a mineralized zone running in a north and south direction, and on this zone several claims have been located. Beginning at its northern end, the following claims were seen:—

Pete and Iron King.—The Pete and Iron King, adjoining claims, have been purchased by Capt. John



Lower Tunnel at Southern Cross Mine, Alberni Canal, Vancouver Island.

altitude there is to be seen, in a zone of movement in the diabase country rock, mineralization by copper pyrites and pyrrhotite, on which a short tunnel had been driven in for some 8 ft. The mineralization in this tunnel was ill-defined and indistinct, consequently, a second tunnel was started some 30 ft. lower down the hill, to prospect the showing at that greater depth. This tunnel is now in 54 ft., and has been driven on a well-defined slip wall in the diabase country rock. This slip forms the left side of the tunnel, and on that side no mineralization was seen, but the right-hand wall is irregularly mineralized with iron pyrites and copper pyrites which in cer-

Irving and Wm. Wilson, of Victoria. At an altitude of 575 ft. and half a mile west from the shore of Matilda Creek or arm, several open cuts have been made, the longest being 27 ft. These show the zone in the diabase to be strongly mineralized with pyrrhotite and a little copper pyrites. A few feet to the south of this cut a few shots have exposed the rock, which here appears to contain a greater percentage of copper pyrites.

Copper King Nos. 1, 2 and 3.—To the south of and adjoining the previously mentioned claims are the Copper King Nos. 1, 2 and 3 mineral claims, owned by A. Watson and Sullivan. Towards its

southern end the mineralized zone already referred to occupies a ridge, and into this a tunnel has been driven, which for the whole 30 ft. of its length is in solid pyrrhotite. To the east and on the other side of the ridge the rock is soft and very much crinised, and in this very little mineralization could be seen. One or two inclines have been run into the hillside, and these are said to carry ore, but as they were full of water, such statement could not be confirmed by personal observation.



At Happy John Mine, Alberni Mining Division.

Ormond No. 2.—The Ormond No. 2 mineral claim has been located by Beck and Gardhouse on the east shore of Matilda Creek, and prospected by several open cuts and a few shots on surface. In one of these exposures, on a contact between diorite and diabase, there was seen from 3 to 4 ft. of solid magnetite, while from some of the other showings a small quantity of fair copper ore has been taken out, but no extensive mineralization has been proved by the work so far done.

CLAYOQUOT SOUND.

Clayoquot Sound is the first important inlet to the south of Sidney Inlet, and it has many branches, affording a splendid landlocked waterway. This district was visited by the provincial assayer in 1899, when a number of claims were reported on in full. Since then many of the claims have lain dormant, and on a few only has even the requisite assessment work been done.

Good Hope.—The Good Hope claim, owned by the Helga Mining Company, of Seattle, Washington, showed in 1899 a well-defined quartz vein from 4 to 7 ft. wide; since then the owners started a tunnel 126 ft. below the outcrop, to cross-out the vein at depth. In and from this tunnel some 800 ft. of drifting and cross-cutting has been done, without locating any body of pay ore. Still undiscouraged, the owners are preparing to do at least a small amount of further work, which, it is hoped, will meet with better reward, since such energetic development is rare on the west coast.

Killapa.—The Killapa claim is situated on the shore of Disappointment Inlet. An attempt was made to find this claim, which was, however, not

successful, as the trail was not traceable, being overgrown over with underbrush. It was learned later that only the annual assessment work had been done on the property for some years. The following notes are from the report of an explorer who passed the property:

"The most important development work has been done at an altitude of some 600 ft. where a tunnel has been driven 150 ft. in ore. The vein-matter consists of quartz with iron pyrites and copper pyrites, carrying gold and silver, and is about 3 ft. wide."

American Wonder.—The American Wonder claim, situated on Tranquil Creek and owned by General Aston, of Tacoma, was visited in 1899, when a good body of copper ore was exposed. Since then the claim has been Crown-granted and allowed to remain idle, no further work having been done, so the conditions remain as before.

Hetty Green.—The Hetty Green claim is situated on Deer Creek and is owned by Ward and Thompson, of Alberni. Considerable work has been done on the property, and in 1905 some 215 tons of good copper ore were shipped out over a wagon road built with the assistance of the Provincial Government.

BARKLEY SOUND.

Barkley Sound is the most important inlet on the west coast of Vancouver Island, with many arms, extending for 35 miles in a northeast direction into the island, about two-thirds of the distance across, and at the head of the most important arm, Alberni Canal, is the town of Alberni. There are a large



From Starvation Cove, M. Alberni Mining Division.

number of claims situated in the district tributary to the various arms of this sound, and of which many were visited this summer.

Red Rock.—The Red Rock claim, owned by Jay, Graham and Poole, is situated about 2½ miles to the north from the shores of Toquat Harbour (with which it is connected by trail) and at an elevation of 375 ft. above tide water. A small creek flowing through the property has exposed a quartz vein from 2½ to 3 ft. wide, with a strike N. 30 deg. W. and a dip of 65 deg. E. at this point. Below this

exposure, some 20 ft., an open cut 30 ft. long was run, from which some quartz was taken out, carrying \$5 in gold per ton. From the exposure in the open cut it was seen that the vein was flatter than indi-

tunnel the vein does not appear to be clearly defined. The vein is in a diabase country rock, with fairly tight walls, although in the open cut the hanging wall is well defined. The vein-matter is somewhat



Basin and Mineralized Cliffs, Big Interior Group, Alberni Mining Division.

In his report on this property the provincial assayer says: "Practically, this entire face, some 4,000 ft. wide by 1,000 ft. high, shows the strong red colour due to iron stain, while at the base there are thousands of tons of the same rock which have been mined by the action of the elements."

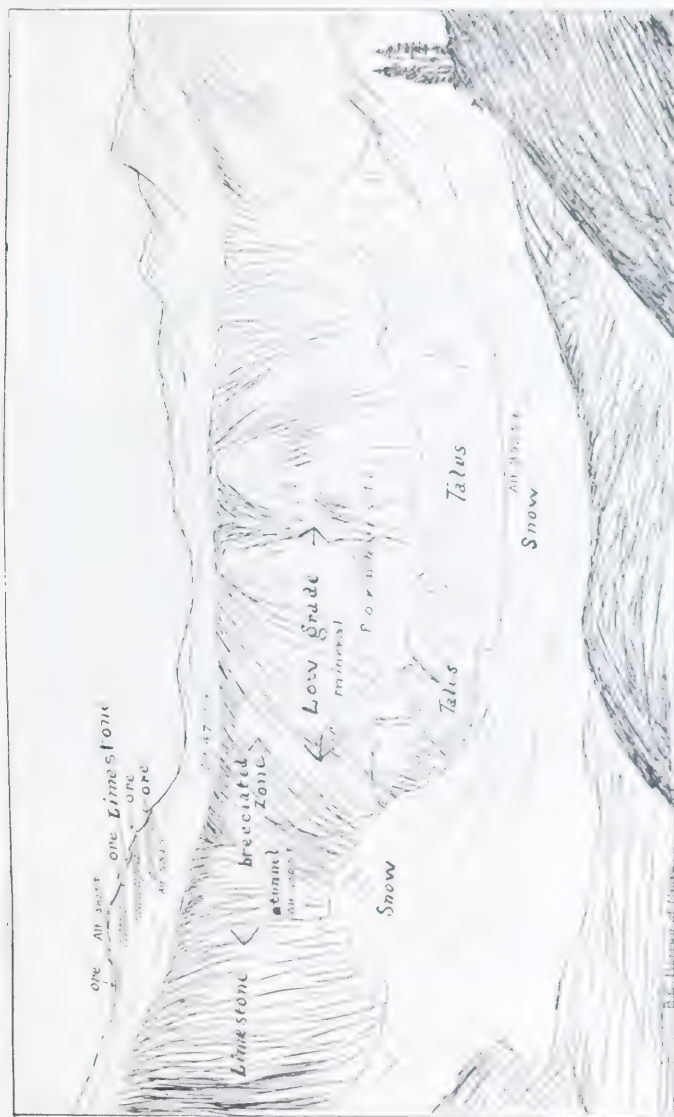
cated by the outcrop, consequently, a tunnel was started at the end of the cut and under the vein as exposed. This tunnel gradually turns to the right, so as to cross-cut the course of the vein, but in the

brecciated in structure, containing enclosed fragments of the country rock. The owners claim to have obtained good gold values from the vein and that the wall rock also carries values, but such were

not apparent in the samples taken by the writer for assay.

Enterprise. This claim is situated on Pinnock Island, on Sechart Channel, Barkley Sound, and is

small. The lead is 25 ft. wide on the surface (however well defined) and extends to the strike N. 15 deg. E. The vein matter is laminated and shows little alteration. The matrix is fine



owned by J. Crawford Anderson. On the south-west side of the island a quartz outcrop on the beach has been opened by a cut and some surface work; a shaft has also been sunk on the lead to a depth of 40 ft. This latter was, however, full of water when

opened, and the dump consists of 3000 cubic yards and iron sulphides, with slight indications of cinnabar. The mineral in the property located here obtained high values in gold and an appreciable percentage of mercury from the vein, but the samples

taken and assayed by the writer only gave a trace of gold and no mercury. The ore on the dump did not show high values, but as it is much decomposed it is possible the values have been lost. The vein appears to occur on a lime diabase contact and is seen on Nettle Island, farther to the S. E., and it is reported to have been traced on to other islands for one mile and a half.

Building Stone.—On the east side of Effingham Inlet, about 5 miles up, there is a high bluff of reddish brown rock, having a close, fine-grained texture and showing no cleavage or bedding planes.* Associated with this rock mass are intrusions of a greenish eruptive, having a more or less amygdaloidal structure. The deposit has been taken up as a quarry

the bluff above. This tunnel has been run in a nearly straight line S. 17 deg. E. for 180 feet. At 117 ft. in two drifts have been run at nearly right angles, the one to the right for 54 ft. and the other to the left for 40 ft. Some years ago a winze was sunk at 47 ft. in on the tunnel to a depth of 50 ft., and a drift run back towards the river of 50 ft. This winze and drift are now full of water. There has been a considerable amount of surface stripping done on different parts of the claim.

The entire surface is heavily timbered and covered with underbrush, but, from a general examination of the property, there would seem to be contact of a felsitic rock with limestone, and along this contact later diabase dykes** have intruded, carrying with them



Great Central Lake, Alberni District, Vancouver Island.

by J. C. Anderson, of Sechart, and it is possible the rock may have some value as a building stone.

Sarita Group.—This group consists of the Black Bear, Eureka, United, Southern Cross, Middy, British Pacific, and also a leased strip of the Indian reserve fronting on the Sarita River. The property is owned by Wm. Wilson and Capt. J. Irving, of Victoria. The claims are reached by following up the Sarita River from Barkley Sound about one mile from deep water, where an outcrop of ore is seen in the river. Some 10 ft. above the river a tunnel has been driven under an outcrop of ore showing on

a little mineralization, consisting principally of pyrrhotite with a little chalcopyrite and arsenical iron. The mineralization is not evenly distributed through the dyke matter, some parts carrying copper and others none. At present no body has been developed large enough to pay the cost of extraction.

The tunnel cross-cuts a diabase dyke 40 ft. wide, while the drift to the left, where the work is now

**The following is the report by Dr. J. A. Dresser, of Montreal, on a microscopic examination of this mineralized dyke matter:—

"No. 4,007.—This is a dark green or greyish green rock; consists of lath-shaped crystals of plagioclase feldspar arranged about crystals and the irregular masses of pyroxene. Smaller interstices amongst these minerals are filled with quartz. Grains of magnetite are enclosed in the various other minerals. The structure of the rock is that known as ophitic, and the rock is therefore a quartz diabase."

*The following is the report of Dr. J. A. Dresser, of Montreal, on a microscopic examination of this rock:—

"No. 4,002.—Anderson's Red Rock, Effingham Inlet, B.C.—This rock consists of angular grains of quartz, which are cemented together by fine aggregate of granular material, which is almost wholly hematite. The rock is a jaspilite or impure jasper."

being done, starts on the dyke, but at 40 ft. turns, cutting through the dyke and at the face is about 2 ft. in the felsitic country rock, the strike of the dyke at this point being N. 6 deg. E. with a dip of 66 deg. N. A systematic tracing of these dykes on the surface would much facilitate the working of the claims and would save a considerable amount of work underground.

The assay values from samples taken were as follows: Straight pyrrhotite: Gold, 0.16 oz., and silver, 1.12 oz. per ton; copper, none. Ore from outcrop: Gold, trace; silver, 0.2 oz. per ton; copper, 6.2 per cent.

Cascade Mine.—The Cascade mine is situated on

which are seen. The evidence would point to the mineralization having taken place during a second period of movement. The end of the tunnel is in the diabase dyke matter, but a little mineral is seen on a slip-wall near the floor. A considerable amount of ore has been shipped from this mine, taken principally from the open cut above and from the drift to the left of the tunnel. A gravity tramway has been erected to convey the ore to sea level, where it was shipped.

Southern Cross Group.—This group is situated on the north side of Uchucklesat Harbour, near the mouth, and consists of five claims—Southern Cross, Ballarat, Little Dipper Fraction, Constance Fraction



Della Lake, Albemarle District, Virginia, U.S.A.

the north shore of Uchucklesat Harbour. Near the head of the harbour the mountains on this side rise abruptly to a height of 3,000 ft. The general country rock is limestone traversed by diabase dykes. At an elevation of 275 ft. above sea level some surface work has been done and an incline sunk on a diabase dyke, which is impregnated with bunches of iron and copper pyrites. Some 25 ft. lower down, a tunnel has been run into the mountain side, on the dyke, for 54 ft. in a general N. 30 deg. E. direction, but turning a little more to the north towards its inner end. At 20 ft. in, the tunnel ran through a shoot of ore, a few feet wide, which is cut off by a slip-wall in the dyke. The mineralization is iron and copper pyrites. Selected samples gave the following assay: Gold, 0.06 oz. per ton; silver, 0.12 oz. per ton; copper, 5.5 per cent. That there has been much movement is proved by the slickensided slip-walls

and North Star. The work has all been done on the Southern Cross. The mountain rises at an angle of about 45 deg. and at an elevation of about 150 ft., on a contact of limestone with an intrusive rock, a well marked slip-wall is seen, having a strike N. 30 deg. E. into the hill, with a dip of 60 deg. towards the southeast.* This same intrusive rock also appears in the two after-mentioned claims, the Happy

Montreal, on a microscopic examination of this rock:—

John and Monitor. Towards the south this slip-wall is cut off, nearly at right angles, by another slip having a strike of S. 55 deg. E. and a dip of 45 deg. into the hill. The northeasterly slip-wall, first mentioned, has been followed along by a tunnel 40 ft. long, all in a body of low-grade ore, occurring in a mineralized zone in the diabase, following along the slip-wall.*

About 100 ft. lower down the hill and slightly to the east, a tunnel has been driven to reach the point where the northeasterly slip and the cross slip, before referred to, intersect. This tunnel is now in 300 ft., and for 200 ft. runs through diabase, at which distance it cuts the cross slip-wall, here found to have the same strike and dip as noted on the upper level. The northeasterly slip-wall was also struck, with an unchanged dip and strike, showing a well-developed ore body on the right hand side, some 6 ft. in thickness. This is seen in a short cross-cut of 46 ft., which runs into the limestone to the right. The tunnel has been continued along the slip-wall 60 ft., with the ore on the right side, when the tunnel swings slightly to the right, and is being run for the limestone contact, which should soon be reached. Where the ore showed strongest a winze was being sunk from the tunnel and was down 20 ft., good ore having been taken out as the winze was being sunk. The winze is now passing out of ore, as the body dips away from it on the main slip-wall. When a greater depth is reached cross-cuts will be run to the ore shoot.

The cross slip-wall before noted has been followed from the main tunnel by a drift running to the left, which is now in a distance of 45 ft. This is fairly well mineralized and may develop a good body of ore. This cross slip is traceable on the surface and has been proved by an open-cut to the left, in which direction the cross-cut is now being driven.

At 175 ft. above the main shaft an open-cut has been run for 75 ft. along a mineralized zone in diabase on a limestone contact. In the open-cut this zone shows for 17 ft., and is mineralized with iron pyrites and a little copper pyrites.

There has been no stoping done in this mine, and

*The following is the report of Dr. J. A. Dresser, of Montreal, on a microscopic examination of two samples taken from this mineralized zone:—

"No. 0.—The Southern Cross Ore.—The rock of this ore, which is an altered porphyrite, is penetrated by narrow seams of ore which maintain a generally parallel direction. In the microscopic section these lines are found to be small fractures in the rock, into which the ore has been infiltrated after the rock has been solidified and fractured. In one case a large feldspar has been broken across and ore has been subsequently deposited in the crevice thus formed. The ore has thus been the latest part of the rock to form, while if it were due to magnetic segregation, it would have been one of the earliest constituents to solidify.

"No. 4,018.—Gangue Material from the Southern Cross Mine.—This consists of radiating tufts of hornblende, chiefly actinolite and masses of some light-coloured zeolite, which is often partially decomposed. This specimen does not seem to throw any satisfactory light on the relations of the ore to the enclosing rock."

any ore taken out has been in the course of development. The management is pushing the development with three shifts and is making a strong endeavour to block out a good body of ore. The mine is equipped with two bunkers and ore chutes on the two working levels, and there is a good wharf on deep water for shipment. The bunkers were partially filled with a very good grade of ore, the values being principally in copper pyrites. A small shipment was made this year (1906).

A sample taken of the best-looking ore in the bin gave, upon assay: Gold, trace; silver, 0.56 oz. to the ton; copper, 18 per cent.

Happy John Group.—The Happy John group is situated on the west side of Alberni Canal, near its mouth, and consists of the Happy John, Happy John No. 1, No. 2 and No. 3 Fraction, which have been surveyed and contain 125 acres. The Happy John and Happy John No. 1 have been Crown-granted, while the others will be this year. The property is owned by Frank Brothers and A. J. Engvik. There are minor showings all over the claims, but the principal work has been done at an altitude of about 300 ft., where an open cut has been run on a diabase dyke near a contact of limestone with a felsitic rock. This cut is 40 ft. long and for the first 12 ft. follows a slip-wall in the diabase. On this slip-wall is a body of solid copper pyrites about 2 ft. 6 in. wide at the widest part, but wedge-shaped, with the apex upwards, which assays about 12 per cent. copper, with 0.06 oz. gold and 1.7 oz. silver per ton.

To the east of this outcrop and some 40 ft. lower down, a tunnel has been driven into a diabase dyke on a slip-wall. Ore shows in the bottom of the tunnel about 2 ft. wide for 15 ft. This is not as strong a showing as that previously mentioned, although it is well mineralized and it does not appear to be the same orebody nor on the same dyke.

At a height of 50 ft. above this lower tunnel, and farther to the east, another tunnel was run into the hillside, on a diabase dyke, and at 21 ft. in cross-cuts diagonally a slip which showed ore, but this slip was not followed. This tunnel is being driven to the contact with the limestone and is now in 55 ft. At 40 ft. in a detached horse of limestone was struck and a drift to the left was here started, which is now being run with the hope of reaching the contact of the solid limestone.

In the vicinity of this work there is considerable evidence of mineralization, as shown by small surface stripping. The tunnels are situated in ground rising nearly vertically, for 80 ft. or so, from the creek below. The means of ascent and descent is by ladders.

On the No. 2 claim, higher up the mountain, a shaft was sunk 12 ft. deep on a slip-wall in a diabase with 2 ft. of ore. A tunnel, now in 40 ft., is being run at a level 300 ft. lower to reach this ore.

Surface strippings show a number of parallel dykes more or less mineralized. Near the mouth of the creek a few shots have disclosed a mineralized dyke carrying arsenical iron, with traces of copper. Samples gave the following assay: Gold, 0.05 oz.

to the ton and silver, 0.05 oz. to the ton, and copper, 0.1 per cent. These claims show considerable copper mineralization and there is reason to hope that a good body of ore may yet be disclosed.

Monitor.—A description of this property was given in the 1901 report, since when the company has ceased to ship ore, but has done some prospecting on its claims, which has been confined to surface stripping. At an altitude of 300 ft. a number of small surface strippings show what is apparently a diabase dyke running through or on a contact with limestone, which dyke appears to be fairly well mineralized, in one place solid copper pyrites being

actually stripped. The mine, however, was not and a long tunnel has been driven to prospect for a new body, with, so far, negative results. The mine equipment is all in good order and in charge of a caretaker, but no work is being done on the property.

Gladys.—This claim is situated on the east side of Alberni Canal, near the mouth. The work on it has been done at an altitude of 400 ft. and several hundred feet back from salt water, where a few shots have been put in on a horse of limestone appearing in the diabase dyke, mineralized with copper and iron pyrites and a little arsenical iron. A shaft has been sunk on the dyke, 25 ft. lower, from which a consid-



Dell's and Gladys' Mining Claims, Alberni Mining Division.

seen. This ore gave the following assay: Gold, trace; silver, trace; copper, 16.2 per cent. While no defined body of ore has been disclosed, there is evidence which would warrant further prospecting by the company.

Nahmint.—This mine is situated on the west side of the Alberni Canal, 14 miles from Alberni. The Nahmint Mining Company, Limited, was organized in 1898, with a capital of \$100,000, and in 1899 had done 2,100 ft. of underground development work, which disclosed a considerable amount of copper ore. In 1900 an aerial tramway was installed

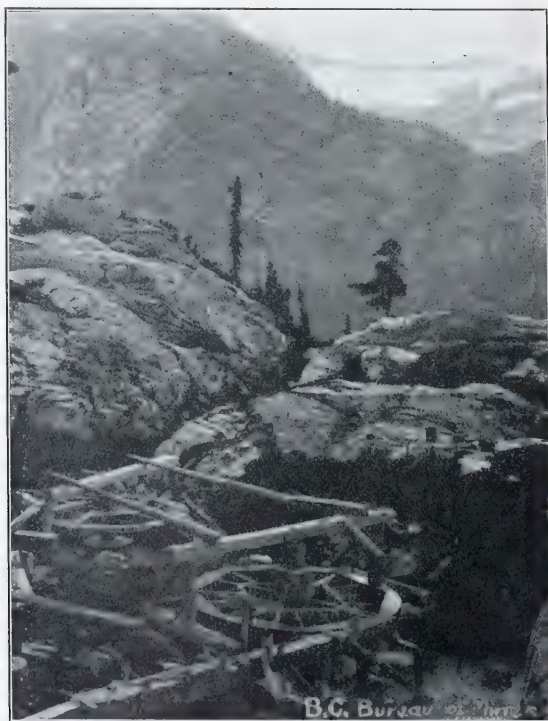
and a considerable amount of ore has been shipped. The shaft was full of water when visited, and the ore at present remaining on the dump is only second-class, the dump having been hand-picked and the first-class ore shipped. According to a miner who had worked in the mine, there was still good ore in the bottom of the shaft, but financial difficulties necessitated the temporary closing down of the property. The assay of some selected samples taken give the following results: Gold, 0.2 oz. per ton; silver, 2.32 oz.; copper, 16.43 per cent.

Edith Group.—This group, consisting of the

Edith, Black Bear and Bruin, owned by E. A. Waterhouse, of Alberni, is situated on the east side of Alberni Canal, a short distance from its mouth, and is reached by a trail from the beach about a mile long, although the distance to salt water would be less in a direct line. The workings are at an altitude of 475 ft., where a tunnel has been run in a S. 65 deg. E. direction for 30 ft. This tunnel was started on a lime-diabase contact, but was diverted, continuing entirely in diabase, following a strong slip-wall along which no ore was visible, although some ore seen on the dump was presumably taken out of the tunnel. A few hundred yards to the east

distance of 12 miles, by wagon road, the elevation of the lake being 200 ft. above the sea. This inland sheet of water presents the same physical features as do the inlets which indent the west coast of Vancouver Island, the mountains rising abruptly from the water, with here and there a valley extending back for a considerable distance, the most important valley being that extending to Ash Lake on the northeast.

The general length of the lake is east and west, and it is about 25 miles long by a mile or so wide. At its western end two creeks flow in, heading from mountains still farther to the west. A trail from



Arrastra, Della and Glacier Mineral Claims, Alberni Mining Division.

a number of open cuts have been made and shots blasted in diabase, which show more or less mineralization with copper pyrites, iron pyrites and pyrrhotite, the last, however, predominating while in one of the open cuts solid pyrrhotite was noted.

GREAT CENTRAL LAKE.

Considerable bodies of ore having been reported to exist at the head of Great Central Lake, Alberni district, it was decided to make a preliminary examination of that region; which was done towards the end of August, 1906. Great Central Lake can now be reached with ease from the town of Alberni, a

the lake follows the most northerly of these creeks on a gradual ascent for a distance of 10 miles until it ends in a basin, shut in by high mountains, the basin having here an elevation of 1,500 ft. above Great Central Lake, or 1,700 ft. above the sea. To the south a precipitous bluff rises 2,075 ft. high, from which pours a considerable stream of water that barely touches the rocks until it reaches the bottom, breaking into a mass of spray in its descent. The ascent of the bluff requires stout muscles and the aid of the small bushes which cling so tenaciously to the clefts in the rock. On the top there is a

small rocky plateau or basin enclosing a lake about half a mile long by a quarter wide, the elevation of the lake being 3,350 ft. above the sea. This mountain lake, situated in the heart of Vancouver Island, with snow-clad mountains rising 2,000 ft. above it and the blue crevassed glacier of the Nine Peaks showing up to the south in the morning sun, forms a beautiful scene.

Big Interior Group.—This group consists of seven claims, viz.: Big Interior Nos. 1 to 7, and was located by Drinkwater & Nicholls, of Alberni. The claims are reached from the head of the small lake referred to by following up a small second basin, slightly to the north of the main basin, about a quarter of a mile. The head of this second basin is hemmed in on three sides by precipitous cliffs 1,000 ft. high, on which rests a snow cap, terminating in peaks which are 2,000 ft. above the lake below. Practically, this entire face, some 4,000 ft. wide by 1,000 ft. high, shows the strong red colour due to iron stain, while at the base there are thousands of tons of the same rock which have been mined by the action of the elements. A closer examination shows this cliff to be a granitoid rock,* mineralized with copper pyrites, pyrrhotite and pyrite in varying proportions, some zones showing strong mineralization, while in others it is more sparse. To the west the rock assumes a brecciated structure and has been cemented together by a filling of calcite, with a considerable impregnation of copper carbonates and into this zone a tunnel has been driven a distance of 31 ft. The ascent of the bluff is somewhat dangerous, owing to the rather precarious foothold and the absence of vegetation, the top being reached at an elevation of 1,375 ft. above the small lake. From the top of the bluff a snowslide was followed until a further elevation of 500 ft. was reached, at which point the ore is uncovered and shows the strongly mineralized granitic mass which is seen to penetrate nearly horizontal strata of limestone, alternate bands of which continue to the top of the mountain 500 ft. still higher. This sharp ridge, with an altitude of 5,700 ft., may be

considered as the backbone of Vancouver Island, shedding the water to the south down Alberni Canal, to the northeast down Buttle Lake and Campbell River, and to the west by Bear River into Clayoquot Sound.

Summarizing the conditions, the mineralized zone, showing in the face of the cliff to the north of the basin and forming the great mass of low grade mineral on the property, is so large, so inaccessible, and the mineralization so scattered, that it would be impossible to obtain anything approximating an average general sample of the exposure without the expenditure of an amount of time and money not justifiable under the circumstances. However, at the foot of the cliff, and as illustrated in the accompanying sketch, there is a talus extending the whole length or width of the mineralized zone, made up of material broken away from the whole face of that zone. While this talus may to a certain extent have been affected by weathering, it still may be considered a very approximate sample of the inaccessible cliff. Samples were taken from this talus, from which it is judged that approximately the central portion of the mineralized zone will assay from 0.5 to 1 per cent. copper, with from 1.5 to 2 oz. silver per ton, and a trace of gold. These values extend over a width of about 1,500 ft., while to the right the mineralization gradually fades off into the country rock.

To the left of the mineralized zone is what has been called, for purposes of designation, the "brecciated zone," and which is merely a continuation, to the left, of the mineralized zone which has here been subjected to a crushing due to movement, and in which the interstices between the fragments of the rock have been filled with secondary minerals, chiefly calcite, with some carbonate of copper, forming a secondary enrichment. This secondary enrichment has taken place, as would be expected, along defined channels, producing streaks of higher grade mineralization often forming commercial ore. Here, again, no general sampling was possible; although a tunnel has been driven for some 31 ft. into the bluff, it was found impossible to examine the face of the cliff for 10 ft. on either side of the tunnel mouth.

The mineralization just described, and which forms the great bulk of visible mineralization on the property, is admittedly very much diffused through the rock, which consequently is too general to be of value only if found amenable to some form of concentration, and of which there seems to be a fair probability.

On the top of the talus, to the left of the tunnel to the left of the centre in the sketch herewith, is an area in which the mineralization seems to be more concentrated, producing, in places, ore of a grade to such an extent that it is possible to mine. This higher grade ore appears to occur along the lines of contact of alternating bands of granitic rock and limestone. The extent of the latter deposit it was not possible to determine, as the ore was found to be covered in most places by a heavy covering of snow, and in many places seemingly permanent snow and

*The following is a report of Dr. J. A. Dresser, of Montreal, of a microscopic examination made on two samples of the light and the dark-coloured varieties, of this rock:—

"No. 4,069.—Light variety.—This is a holocrystalline, a fine-textured rock having a light grey colour, and is flecked with small needles of green hornblende. In the slide it is found to consist of feldspar, hornblende and quartz. The feldspar is principally orthoclase, although small amount of plagioclase is also present. The hornblende is much altered, chiefly to chlorite. Quartz is present, both in large crystals and also filling smaller interstitial spaces. This rock is a granite porphyry.

"No. 4,070.—Dark variety.—This is a porphyritic rock. The larger crystals or phenocrysts consist of hornblende and feldspar; the former is green and occasionally somewhat chloritized. Feldspar crystals are well formed and belong to the lime soda series. One crystal showed symmetrical extinction parallel to its line of twinning, which was according to the albite law, at an angle of thirty degrees on either side, thus indicating that its composition is that of an acid labradorite. The groundmass is a finely crystalline aggregate of feldspar and biotite. Angular grains of magnetite are scattered somewhat sparingly through the rock. It is a porphyrite."

ice covered the formation. While the future of the property is far from being proven, the very great extent of the mineralization, with occasional concentrations, certainly renders the proposition worthy of most careful investigation and prospecting.

Della and Glacier.—These claims are situated on the small lake in Big Interior Basin, and are owned by Drinkwater & Engvik. On the claims is a small quartz vein from 2 to 3 ft. wide, mineralized chiefly with arsenical iron. Assays of the straight ore gave the following result: Gold, 5.12 oz., and silver, 5.2 oz. per ton; copper 1 per cent. The vein has not yet been worked to any extent, but an attempt is being made to extract the values by roasting the ore and grinding in an arrastra, which has been erected and is being driven by a small water-wheel constructed on the ground. The arrastra had just been completed at the time of my visit.

FORMATION OF ORE BODIES ON WEST COAST.

An examination of the different properties on the west coast of Vancouver Island, especially those on which extensive development work has been done, would point to the following theory as to the mode of ore deposition:—

The properties, with the exception of those in Quatsino Sound and Great Central Lake, present nearly identical conditions. The mineralization occurs in or close to diabase dykes. Sometimes there is sufficient quartz in the fissure to make a quartz vein, but more often an entire absence of quartz, the vein-matter being the crushed material of the dyke. There appear to have been two periods of movement—the first in which the dykes were formed, when no mineralization took place; the second in which these dykes were shattered and twisted, when probably secondary dykes of a similar composition to the first series were injected into the fissures found by the movement. A careful examination of these deposits would lead to the conclusion that mineralization took place at this time, not as a secondary enrichment, but as a direct deposit by ore-bearing solutions from below. The solid mineral is seen to penetrate what were originally cavities, and to follow along old slip-walls, inside of which, as a rule, no mineral whatever is seen, as would be the case if segregation had occurred. The deposits are often of brecciated structure, the ore enclosing fragments of the original dyke-rock and only occasionally is it seen forming a part of the dyke, and then it would be accounted for as forming part of the second upheaval when the later dykes were formed. Mineralization is found along fractured zones in these dykes, and where these fractures contained cavities for the entrance of mineral-bearing solutions there are now ore bodies, but where the ground is tight or shows only slight movement, little or no ore is found.

Chalcopyrite forms the principal mineral of value, while pyrrhotite is a common mineral, occurring both massive and mixed with pyrite and chalcopyrite, but carrying little or no value in itself. Arsenopyrite occurs in many of the properties and, as a rule, carries gold values.

While no geological map or extensive examination

of this region has been made, the general country rock outside of the mineralized zones appears to be syenite, occurring often as mountains of great size and connected with a series of felspathic dykes which penetrate the older rocks.

MINING IN NANAIMO DISTRICT.

Gold Commissioner's Report for 1906.

NANAIMO MINING DIVISION includes part of Vancouver Island, a considerable area of the mainland lying between New Westminster and Bella Coola mining divisions, and nearly all the islands between Vancouver Island and the mainland coast. The gold commissioner for the district reported for 1906:—

"The mineral resources of this division are being steadily developed, and the results generally have been highly satisfactory, many important discoveries having been made during the past year. There were 496 mineral claims in good standing on December 31, 1906, and more mineral claims were recorded than in the year 1905.

"The returns for the year's work from the Tyee Copper Company's smelter at Ladysmith, although not as large as the year 1905, made a good showing for the number of days that the smelter was in blast. Tons of ore smelter in 1906: 29,110; value, \$477,300. With the exception of 4,744 tons, the above was all from British Columbia coast mines.

"TEXADA ISLAND.

"The Marble Bay group of claims, belonging to the Tacoma Steel Company, under the management of A. Grant, mined and smelted during the year 1906, 10,560 tons (dry weight) of ore. The development work done on the property consists of deepening the shaft 100 ft., 250 ft. of drifting and 110 ft. of winze sinking; the total depth of the shaft is now 760 ft. below the surface, or 718 ft. below sea level. A new shaft house, 40 ft. x 40 ft. and 90 ft. high, has been erected, in which has been installed a new 10-ft. diameter sheave for the hoisting cable to run over.

"One H Sullivan diamond drill, capable of boring a hole 2,000 ft. deep, has been added to the plant. The average number of white men employed in and about the mine for the year was 50, and 15 Chinese. The copper and gold values show a steady increase with depth.

"The Cornell Operating Company, working the Cornell mine, under the management of J. A. Johnson, mined and shipped about 1,000 tons of ore since July 1, 1906. The development work consists of 100 ft. of drifting and an upraise of 45 ft. A lot of timbering was done to conform with the order of the inspector of mines. The company is contemplating installing a new air compressor, hoist and cage, and boiler.

"W. Thos. Newman, who has charge of the exploitation of the Commodore group of claims on Texada Island, has kindly furnished me with the following particulars of the development work done

on Commodore mine during the year 1906: A plant, consisting of a 40-h.p. wood-burning, locomotive-type boiler; 16-h.p. double-cylinder hoisting engine; Cameron sinking pump; duplex Morris shafting pump; with full complement of blacksmith shop and essential machine tools, was installed, and has been constantly worked throughout the year. A bunk-house and cook-house to accommodate about 40 men, with boiler- and engine-house (the former containing bath-room and drying room), was also built, and a substantial gallows frame, and tramways therefrom, complete the surface plant.

"With the above mentioned outfit 180 ft. of sinking has been done during the year. The main shaft is a two-compartment incline, 5x8 ft. in the clear. From the bottom of this shaft a level has been run north and south for 725 ft., and 128 ft. of cross-cutting has been done. On an average 12 men have been employed during the year, in two shifts. The Commodore mine has three veins capable of being operated from the same set of openings. The main or contact vein is to be the first explored and tested, and is situate directly in the main contact crossing Texada Island between several miles of limestone on the southeastern side, and about the same extent of eruptives on the northwestern side. These operations have demonstrated the vein to be a true fissure, as three dykes have been encountered coming in from the lime-wall side, and the vein has gone straight on without being faulted, even the strong clay parting on this wall being unbroken. The only effect of these dykes has been increased mineralization on the vein in their proximity. The shaft was sunk between two large exposures a distance of 1,140 ft. apart, the drift being pushed either way. To the north the values on the surface are in silver, lead, zinc and copper, in the order named, while the exposures on the south consist of gold and copper. To the south, at a depth of 180 ft., the ore carries a satisfactory amount of gold, and the gangue is mainly quartz. When driven 1,500 ft. this level is expected to intercept both the lateral veins which run into the limestone a known distance of over 2,000 ft. in the Commodore ground.

"The Loyal Lease Company, working the Loyal group of claims, has not shipped any ore during the year 1906, but has installed a 50-h.p. boiler, and employed 10 men. The development work consisted in sinking the shaft 100 ft. deeper; the shaft is now 300 ft. deep, with 700 ft. of drifts.

"The Puget Sound Iron Company has not been working the iron mines during the year 1906; but proposes starting up again in the near future.

"The Forest Queen is getting ready to ship ore again, after having been shut down for the past year.

"There are many other properties on Texada Island on which the owners have done development work enough during the year to keep the claims in good standing.

"VALDES ISLAND."

"The Copper Cliff Mining Company, operating the Copper Cliff group of claims, situate at Copper

Cliff, Valdes Island, under the management of Wm. Smith, has just begun to open up what promises to be a very valuable property, and shipped 120 tons to the Tyee smelter late in the fall of 1906. It has drifted into the mountain 45 ft., close to the sea beach. Only three men were working, but it is the intention to provide accommodation for 20 next year. The ledge is well defined and of unknown width, but on the foot-wall there is said to be 11 ft. of chalcopyrite of shipping grade. An ore bunker to hold 150 tons has been built.

"The Islands Copper Company, owning the True Blue group of claims on Valdes and Gowlland Islands, at Gowlland Harbour, has done considerable development work, sinking 50 ft., and has opened up a large body of copper ore in the diorite several feet in thickness. The percentage of copper shown by the smelter returns on a trial shipment of 22 tons of ore to the Tyee smelter was 2.84 and 6.2 on low and high-grade ores, respectively. A small trial shipment to the Tacoma smelter gave 4.30 per cent. in copper, gold, 0.02 oz. per ton, and silver, 1.3 oz. The cost of transportation to the Tyee smelter, together with the smelter charges, will not be more than \$3.50 a ton; this would leave a handsome profit on even the low-grade ore, and if the orebody holds good with depth, this property should be the making of a mine. There are other properties on Valdes Island that have made good showings for the amount of work done on them.

"Considerable work has been done during the past year on Phillips and Frederick Arms, Thurlow and Cracroft Islands. Most of the peninsula between Hardy Bay and Beaver Harbour, at Fort Rupert, has been located, and some fine showings of copper ore have been found there.

"NANAIMO RIVER."

"The Nanaimo Jubilee Mining Company has not done much development work on its two groups of mineral claims, situate some distance up the south fork of the Nanaimo River.

"GOWLAND ISLAND."

"Considerable work has been done on many claims in this district during the past year, resulting in very favourable showings."

The following statement relative to dredging in Victoria, Australia, was made in a recent letter of a correspondent in that State of the *London Mining Journal*: An improved dredge at Bright is making low grade ground payable, fast-travelling buckets and a separate engine for water supply being employed. The usual quantity of material treated by dredges running here is 100 to 150 cu. yd. per hour, or 1,000 to 1,500 cu. yd. per minute, with main pump and buckets driven by the same engine—amounts to about 3,000 to 6,000 yd. per week. The new plant, during five weeks, turned over 3 acres of ground, at a depth ranging from 10 to 14 ft., or an average of 12 ft., being at the rate of 11,616 yd. per week. The yield of gold from the 3 acres amounted to 301 oz., approximately 100 oz. to the acre, and as the total cubical contents of 3 acres amounts to 58,080 yd., the value of the ground is only a shade over 4 r-2d. (9 cents) per yd.

MINING IN VARIOUS PARTS OF BRITISH COLUMBIA.

Excerpts from the "Annual Report of the Minister of Mines" for 1906.

OFFICIAL REPORTS on several mining divisions of the Province were published in last month's number of the **MINING RECORD**. Additional extracts from the "Annual Report of the Minister of Mines" for 1906 follow:

NORTHEAST KOOTENAY DISTRICT.

Golden Mining Division.—The gold commissioner at Golden reported:

"Mining is practically at a standstill as regards the shipment of ore, and will probably remain so until there are better transportation facilities in the Upper Columbia valley. A large percentage of the ore must be treated on the ground.

"The Monarch, which is situated close to the Canadian Pacific Railway track near Field, is likely to have another trial. Bunk-houses have been commenced and a wire cable to convey the ore down to the track is on the ground. A lease of the Golden smelter has been secured, where the installation of new machinery is contemplated for the treatment of this particular ore, which has hitherto always been done at a loss. Whether this proposed new treatment will be successful or not remains to be seen.

"Work on a small scale has been prosecuted continuously on the Shining Beauty group of claims, the property of the Labourers' Co-operative Company, and the only one at present worked by them. The development work consists of one tunnel 400 ft. and another 200 ft.

"Work was discontinued on the Giant during the summer, but will be resumed again shortly.

"All other work in this division consisted practically of assessment work only."

Windermere Mining Division.—The mining recorder for this division, in which are the head waters of both the Columbia and Kootenay Rivers, the former running north and the latter south, reported:

"Railway communication, which is not far off, construction being actually under way, will change conditions tremendously, although, as a matter of fact, the different properties can ship at a profit under the present inadequate transportation conditions.

"The following properties made shipments before the close of navigation on the Columbia:—Tecumseh, Nettie M., Black Diamond, B. C. and Tilbury, Ptarmigan and Paradise, which, with the exception of the last named two, were worked by local owners and one lessee. The Tecumseh, Paradise and Ptarmigan will continue work throughout the winter.

"Lead Queen Group, on B. D. S. Creek, a tributary of No. 3 Creek, continues to improve with development work, which, as heretofore, is being done on the sole resources of the three original locators. It is expected that this property will become one of the

large shippers in East Kootenay. The owners will continue work throughout the winter.

"A new strike was made this season, on September 17, on a tributary of the north fork of Toby Creek, and is known as the Comstock group. The pay-streak averages about 3 ft. in width, and is said to assay \$86.39 to the ton in silver and lead. The owners have established a winter camp and are taking out several carloads of ore for shipment in the spring. This property is considered one of the most promising locations made in East Kootenay. It is understood that development work on an extensive scale will be commenced in the spring.

"Nothing more than the usual assessment work has been done on the majority of the properties, in anticipation of the advent of new capital."

SOUTHEAST KOOTENAY DISTRICT.

The gold commissioner reported of Fort Steele mining division as follows:

"The following table shows approximately the number of mineral claims held during each year since 1899:

	Held under Crown Grants.	Certificates of Work.	New Locations.
1899	37	718	729
1900	71	704	470
1901	104	642	455
1902	117	451	253
1903	142	335	200
1904	167	260	169
1905	189	193	181
1906	241	235	160

"The assessment work done on mineral claims shows a slight increase, but the number of new locations is smaller than in the previous year.

"The shipping mines have been the St. Eugene group at Moyie and the Sullivan and North Star groups at Kimberley. The North Star group has shipped only 2,900 tons of ore, but has been energetically pushing development work throughout the year. Work has been continued on the Stenwinder, a neighbouring claim to the North Star, with good results, and this claim will undoubtedly be added to the list of shipping mines in this division within the next twelve months.

"The syndicate which secured rights during the year 1905 to prospect under the waters of Moyie Lake, between the St. Eugene and Aurora groups, has been boring on the eastern shore and in the lake, and expects to reach the vein shortly.

"Development work on a large scale would be justified on many properties with the present means of transportation, but capital seems to be waiting for cheaper transport.

"The silver-lead ore from this mining division has this year contributed largely to the total mineral production of the Province.

"Placer Mining.—The usual output from Wild Horse Creek by Chinamen has been made. An hydraulic plant has been completed by a company of

white men, who wasted for six weeks during the early part of the fall.

"One hydraulic company has been operating with a large staff of men on Perry Creek during the whole summer. The steam shovel previously installed on this creek was not operated this year.

"The company operating on Bull River resumed work late in the fall, but I have no details of the work done.

"Coal and Coke. The Green's Nest Pass Coal Company continues shipping coal and manufacturing coke in large quantities. In consequence of its mines having been closed for some months by a strike, it has not been able to supply the constantly increasing demand. The provincial mineralogist will report more fully on its operations than I can. The installation of improved machinery during the year will result in increasing the daily output.

"The Imperial Coal and Coke Company, having uncovered coal on the different groups of coal licences held by it on Fording River, has applied for and obtained leases over 89 lots, covering 53,851 acres of land. The preliminary survey of a railway route to these properties has been completed.

"The Elk Valley Coal Company, holding 44 licences and leases on the upper Elk River, has discovered coal on several of its claims, and is continuing the exploration of the others.

"Coal has also been discovered and leases have been granted on 41 lots lying immediately north of Lot 4,588, on the upper Elk River, and leases have been granted covering 26,240 acres.

"Coal licences covering 13,440 acres on the north fork of Michael Creek are in force.

"A syndicate holds 16 coal leases, covering 10,240 acres, at the northern end of Lot 4,593. I have not in my office any record of the number of coal licences and leases in force in the other parts of this lot."

TROUT LAKE MINING DIVISION.

The mining recorder reported, in part, on the progress of mining in the Trout Lake Division for the year 1906 as follows: "There has been no marked activity in mining in this division during the year. The most notable event has been the acquisition by the Ohio Mines Development Company, Ltd., of the Broadview and other properties situated on Great Northern Mountain. These claims, which are within easy reach of transportation, are credited with having large bodies of medium grade ore.

"Poplar Creek camp, which was said to contain many good gold properties and of which much was expected, remains still practically undeveloped.

"On the Silver Cup only development work was proceeded with from January 1 to March 21, at which latter date the mine was closed temporarily, owing to possible danger from snow-slides. Operations were resumed in April, since which time the mine has been working steadily. The chief aim of the management throughout the year has been development; this has been confined to the ground lying to each side of the raise connecting the lower level with the old workings above. Three levels have

been run between these points, and the ore showings discovered are very satisfactory. Drifts and crosscuts 2,065 ft., and 95 ft. of raises, were run, making a total of 2,160 ft. No new machinery was installed, but a pipe-line has been laid, thus permitting of the driving of the compressor by water-power during the winter months. An average of about 100 men were employed during the year. About 700 tons of first grade ore, galena with grey copper carrying a high percentage of silver, was shipped. It is the policy of the management to maintain ore shipments averaging about 100 tons a month. This property is owned by the Ferguson Mines, Ltd., and is situated on the south fork of Lardo Creek, about 7 miles from Ferguson.

"Ground-sluicing has been carried on to a considerable extent on the Yuill group, which lies immediately below the Silver Cup property, exposing a lead from 4 to 5 ft. wide and carrying about 4 in. of galena. This is on the strike of the Silver Cup vein and is believed to be a continuation of that vein.

"The Reward Gold and Silver Mining Company, Ltd., is driving a long tunnel near Six-Mile, on the south fork of Lardo Creek, to cut at great depth the porphyry dyke in which the Silver Cup and Nettie L. mines lie, and ran 500 ft. during the year, thus making the tunnel 1,050 ft. long.

"On the Winslow, situated about one and a half miles west of the Silver Cup, a cross-cut tunnel has been driven 140 ft., cutting a quartz vein about 8 ft. wide, which carries good gold values. Considerable work, of a prospecting nature, has been done on the Star group, situated near the last-mentioned property.

"The Broadview, situated on Great Northern Mountain, was operated from January to April by a local syndicate, with a force of about 14 men. During this period 230 tons of ore were mined and shipped, and considerable development work done. On September 1 the property was acquired by the Ohio Mines Development Company, Ltd., which has since driven 470 ft. of drifts, crosscuts and raises. The work so far undertaken by this company has been purely development. The lead, where cut, is said to contain 26 ft. of milling ore. Sixteen men have been employed during the period. The Thus Bell, St. Elmo and True Fissure, adjoining properties, are under bond to the same company.

"Cashew's development and residence on the Lucky Boy, which is situated on Trout Creek and owned by the Chestnut Hill Mining Company, Ltd., seven men being employed for about three months during the summer. Thirty tons of ore were shipped from this property.

"On the Copper and Gold, situated on R. 2 Creek, a number of open cuts were made and the vein stripped for a considerable distance. This property possesses an excellent surface showing and carries good gold values."

LARDEAU MINING DIVISION.

The mining recorder for the Lardeau mining division reported for 1906:

"There has been little change in the mining situation here since the report of last year. The location of mineral claims has slightly increased, whilst the assessment work recorded has slightly declined. This, however, indicates that locations without merit are allowed to lapse. The same companies actively engaged in mining during last year are one and all showing their faith in the district by pushing development and by enlarging their mining plant and adding machinery which will increase their output.

Beatrice.—The management of this valuable property has passed from the original owners into the hands of heavy shareholders, whose intention it is to prove, and that as quickly as possible, that the Beatrice is a rich silver-lead property. Ore has been encountered in the intermediate tunnel, which was being driven for last year. Now attention is being directed to strike the ore-body in the lower tunnel.

Eva.—This mine is Camborne's mainstay in free gold. The company has slowly, but surely, demonstrated that it has free gold in paying quantities, and has raised the property to the self-supporting (and hopes during the coming year to the dividend-paying) stage. This company, in the past, has been supplying its 10-stamp mill with something like 1,000 tons a month, by hand-drilling, but before this reaches the press, a Rand air compressor, which is now being installed, will be supplying air to seven or eight air drills. With the addition of 10 other stamps, it will not be difficult to treat practically double the above tonnage, with the same monthly expenditure.

Gold Finch.—This company resumed operations in the spring, and has by systematic development proved that free-milling ore still exists on its property. Reconstruction of the aerial tram, which was burnt out two years ago, is looked for in the spring of 1907, and the stamp-mill will then be again started.

Mammoth.—The Edward Baillie Syndicate, operating this property, is working under great disadvantage, developing it during winter by using the proceeds of the very rich ore which is extracted from the surface in the summer. In the event of the lead being struck in the present workings ore can be taken out the year round.

Oyster Criterion.—This property is still lying idle. The confidence displayed by the shareholders at the outset has never been shaken by lack of merit in their holdings at Camborne.

Silver Dollar.—This company has installed a saw-mill, aerial tramway and air compressor, and has a stamp-mill, with crusher and Chilean mill, *en route* to the property. Owing to the mountainous trail to the mill, some five miles above Camborne, and the nature of the machinery to be taken up for installation, there will, of necessity, be a period of heavy expenditure. The management by this time should know the value of their ore, also the available quantity, and should be in a position to inform the shareholders, should they require the information, the net proceeds from the ore—I say net advisedly. Milling can only extract a percentage of the ore, and

at present any values remaining in concentrates could not be reckoned on to yield full values, on account of cost of transportation of same to the smelter.

Del Ray.—This property adjoins the Silver Dollar. Considerable work has been done on this during the past year, but the owners being away nothing authentic can be stated. The contractors, however, report good bodies of ore everywhere, and the values are supposed to be eminently satisfactory.

One location made during the past year is worthy of note, viz., the Berneire. A specimen from this property is on exhibition, apparently a piece of white quartz weighing about 100 lb., and covered with visible gold. This location adjoins the Nelson group, a free-milling gold proposition, and being directly in line with the Eva and Gold Finch properties, it would tend to show the continuity of the gold belt through this section.

LILLOOET MINING DIVISION.

No changes of importance took place during 1906. The gold commissioner reported:—

"The Lorne mineral claim, at Cadwallader Creek, was worked as usual with an arrastra, which crushed 215 tons of ore, yielding \$5,441.82, which was a good result from such a primitive mode of treating the ore.

"The purchase of the Wayside mineral claim at Bridge River by Osmond Ferguson, is worthy of note. The surface indications are good, but the property has not yet been proved at depth.

"The Anderson Lake Mining and Milling Company's mineral claims at Anderson Lake are bonded to J. Burley Smith, of Montreal, who informed me he had undertaken to form a company in London, England, with a large capital to operate the same.

"Babb, Ferguson, Walker & Swanson have done considerable development work on their placer leases at Alexander Creek. They employed an average of 15 men and took in a large hydraulic plant over a trail for the greater part of the way. They intend working two monitors, having a good water supply, and the ditch, which is 1½ miles in length, is nearly completed. They dammed the outlet of No-fish Lake, for the purpose of storing water. The lake is about two miles long by one-half mile wide.

"The Jespersen leases at Cayoosh Creek were not worked to the same extent as last year. High water, at various times, prevented the re-building of the dam, so only four men were employed in prospecting and development work.

"The yield of placer gold ascertained amounts to only \$14,000, which is \$10,000 less than last year, owing chiefly to the cessation of work by the dredge by reason of liquidation of the company that operated it, and the departure of nearly all itinerant Chinese miners to Bullion, where they obtained employment at high wages.

CLIXTON MINING DIVISION.

"Mining in all its branches," the gold commissioner reported, "has been practically at a standstill, and no improvement in value over that of 1905.

The total yield of gold, so far as ascertained, was under \$1,000.

"A certain amount of prospecting has been done on the mineral claims (except on Bonaparte River).

"On a few of the reported claims sufficient work has been done to hold them for another year.

"The holders of the dredging leases on the Fraser River, in this division, have seen their way clear to install a Keystone drill to test the value of the gravels in the bed of the river, a method which I have advocated for years. It is an expensive way of prospecting, but in the end far better than building an expensive dredge and launching it on what may be a worthless part of the river. The work done by an imperfect dredge on Horsebeef Bar, below Lillooet, has convinced me of the far-seeing ideas of the late Dr. Dawson. In a conversation with him several years ago, he said: 'The mineral values in the Fraser River were enormous, but they were at depth, and science and mechanical skill would, some time in the future, find ways and means to reach them.' The Keystone drill was installed late in the season, and only three or four bore-holes put down a distance of 50 to 60 ft. each, when extreme cold weather set in and all work was stopped until next April, at the earliest, when prospecting will be renewed and continued with vigour until the lessees feel justified in setting about the construction of a modern dredge powerful enough to deal with the gravels in that very turbulent river.

"Placer mining has been confined to a few itinerant Chinese and Indians."

OSOYOOS MINING DIVISION.

The following information relative to mining operations in the Osoyoos mining division is from the report of the gold commissioner for the district:—

"Camp Fairview.—Very little mining work has been done this year outside of assessments, excepting on the Stemwinder. The company operating this mine has, during the past year, undergone re-construction, and is now known as the Stemwinder Gold and Coal Mining Company, Limited. A new flume, more than a mile long, has been constructed from Reed Creek to the head of the pipe-line, which doubles the water supply available for power and treatment purposes, and will, for a portion of the year, enable steam costs to be entirely dispensed with. A large belt-driven, cross-compound, Rand air compressor has been installed in the mill near the Corliss engine, by which it can be driven; the compressor may also be driven by the water wheel. A supply of the new Murphy drills has been obtained, from which great things are expected. The shaft is being sunk to the 600-ft. level from the bottom of the present 300-ft. incline shaft, all new work being perpendicular. A raise is to be made from the present 300-ft. level, which will come out at the back of the mill and give an admirable site for new head-works, dump and crusher, and facilitate the delivery of ore to the mill. The ore has been found under the break which caused temporary suspension some time ago, and unless unlooked for difficulties arise,

in commencing the already well known sinking operation, there will become available a large amount of pay ore that will demonstrate the value of this property.

"On Rogers Mine, which but little work has been done, neither the Terminal or Crest Dredge has claims.

"Camp Hedley.—On the Nickel Plate and other properties of the Yale Mining Company less development has been done than in any other year since the property was bonded in 1898; but it was a record year for extraction, and this was done with a view to obtaining the maximum value of which the existing plant and ore in sight was capable. Fortunately, the amount of development done before the present manager took charge was sufficiently extensive to permit of this course of 'picking the eyes out,' without any serious impairment of the value of the property. The development was confined to exploration work with the diamond drill, of which 3,600 ft. was done on various claims of the Nickel Plate group.

"The tonnage of ore mined and milled during the year was about 35,000 tons, principally from the Nickel Plate and Sunnyside claims. No addition of any importance was made to the plant, but a few necessary changes were effected. The postponement of extension of the works or improvement of the plant may be attributed to the failure of the railway company to complete construction within the time named. The mining company had already paid large sums of money for haulage of plant from Penticton, and when it was promised railway connection in the early autumn of 1906, it was perhaps justified in waiting for it before bringing in additional plant. The concentrates have been hauled by wagon to Penticton, a cheaper rate of inward haulage being obtained by giving the freighter a load of concentrates for back loading.

"On the Humming Bird group of claims, owned by J. J. Marks and others, there was done, in addition to considerable prospecting, 2,000 ft. of diamond drilling, from which satisfactory results were obtained.

"The Golden Zone group, owned also by J. J. Marks and associates, and consisting of the Golden Zone, Silver Bell, B. C. and Irish Boy, was improved to the extent of about \$1,000 worth of work. Former shafts and tunnels were extended and a new find made which gives excellent assay values. The total development done on these claims is more extensive than that done on the average claims held by private parties.

"The Florence group, owned by the Florence Mining Company, and operated by The Florence Development Co., Ltd., expended work during the year. The amount already expended on these claims, the Florence, Florence fractional and Zeerust fractional, amounts to more than \$8,000, principally in tunnelling. The ore is arsenical pyrites carrying satisfactory gold values.

"On the Greenwood group, owned by Duncan Woods, three men worked the greater part of the summer on development work.

"The Kingston group, consisting of the Kingston,

Metropolitan, War Horse and Grand View, is owned by the Kingston Gold and Copper Mining Company. Development work has been carried on steadily most of the year, the force employed being from four to seven men. Much more good copper ore was exposed, and additional buildings for the mine crew were provided.

"The Jumbo group, situated on Sixteen-Mile Creek, had a great deal of development work done. A shaft was sunk, under the direction of G. M. Gilbert, to a depth of 100 ft., and also a considerable amount of cross-cutting done.

"The Oregon group, consisting of the Oregon, Winchester, St. Barnard, and Savage, is situated on the north bank of 16-Mile Creek. About 30 ft. of tunnelling was done, resulting in an excellent copper showing."

YALE DISTRICT.

Ashcroft, Kamloops, Nicola, Similkameen, and Yale mining divisions are in Yale district. Extracts from the reports of mining recorders of three of these were printed last month. The report of Nicola mining division this month follows that of Kamloops. The district gold commissioner reported:—

"Placer Mining.—The yield of placer gold in the Ashcroft, Kamloops, Similkameen and Yale divisions, which formerly showed good returns, has been of so little value as to be unworthy of mention. This is a matter of deep regret, as it apparently marks the termination of an industry which, in past years, provided a remunerative occupation for a hardy class of men, whose history is closely associated with the early days of the Province.

"The mining recorder at Yale, in his report for the year 1905, stated the yield in the Yale division to be only \$2,000. That of the Ashcroft division also showed a remarkable decrease in the usual output, whilst a similar amount to that of the Yale division was credited to the Similkameen district.

"Since the abandonment of the Fraser River by the whites, placer mining has been steadily prosecuted by Indians and Chinese, principally the latter. The same bars, and other localities favourable for the deposit of float gold, are mined with results varying every year, caused by the spring floods carrying away bars situated at a considerable distance higher up the river, and depositing the gold they contained at points lower down, where it remained until the following spring.

"The new dredge, constructed at Yale last fall by a New Zealand company, was operated several weeks, in charge of a crew of experienced men, but I have not been able to obtain the particulars of the results. It is the intention to remove it to Hill's Bar next season, where the amount of success obtained will determine the future of the lower Fraser River in regard to dredging operations.

"Mineral Claims.—To offset the exhaustion of the placer mines, the mineral claims of the districts are attracting attention. The approaching construction of the V. V. and E. railway through the Similkameen country will open up a promising mineral section, which, in consequence of lack of railway communication, has remained comparatively undeveloped.

"The development of the Nicola coal mines will not fail to stimulate mining interests by a supply of cheap coke necessary for smelting.

"At Highland valley, in Ashcroft mining division, on the Transvaal group and other locations, work has been diligently performed on the mineral deposits they contain, with results that prove their valuable character."

KAMLOOPS MINING DIVISION.

The following notes concerning the mineral locations in this division refer only to those on which the most development work has been accomplished. There are many others on which mere assessment work has been performed, this being insufficient to give any idea of their permanence:—

"Iron Mask.—The Iron Mask, Capt. J. Argall, manager, was worked during the past year with a force of from 60 to 80 men, until the beginning of last October, when the number was reduced pending arrangements being made to increase the returns, by utilizing the large bodies of low-grade ore, which will yield profitable results with the introduction of a more economical mode of transportation and treatment. To effect this object, negotiations are in course of progress for the erection of a large smelter near the Canadian Pacific railway line, where a suitable site has been obtained for the purpose. The ore will be transported by an aerial or gravity tramway. These improvements will admit of operations being prosecuted on a larger scale. The quantity of ore shipped to the smelters in Kootenay, since my last report, I understand, is 3,720 tons.

"Wheal Tamar.—The Wheal Tamar is situated in the Joeko Lake section. It was steadily worked last summer with a small number of men, in charge of O. S. Batchelor. A 'common sense' whim was installed and housed in with a substantial frame building. Cross-cutting was performed at the bottom of the 50-ft. shaft. Forty feet of the vein was intersected and produced ore of similar class and value as the outcropping on the surface, which contains ore 60 ft. wide, that can be worked to advantage, and 200 ft. of low-grade ore that may be found profitable under more favourable conditions in regard to treatment. The vein has been cross-cut in different places for a considerable distance.

"Evening Star Group.—This group consists of three claims, viz., Evening Star, Golden Star and Bill Nye. It is situated about six miles southwest of Kamloops, immediately south of the Iron Mask mine. The vein runs northeast and southwest, and has been proved by open cross-cuts to extend the whole length of the three claims. The ledge is from 40 to 100 ft. in width on the surface. The principal work has been done on the Evening Star. A tunnel was run from a small lake to intersect the vein; at about 35 ft. from the entrance a lode of high-grade ore was encountered, 6 ft. wide. A shaft, 4x9 ft.

in the case, with two compartments. All the way down, has been sunk a depth of 30 ft. At a depth of 10 ft., a body of clean ore 1 ft. wide cut through, dipping to the northeast, and at 56 ft. had passed out of the shaft. A drift was started at this point 20 ft. long, in ore of the same grade, which yields \$35 a ton, in all values. About $1\frac{1}{2}$ carloads are now on the dump, which will pay to send to the smelter. Another shoot of similar grade, 6 ft. wide, exists at the bottom of the shaft. Between the two high-grade veins is a large body of low-grade ore which, with a smelter in the vicinity, would yield profitable returns in combination with the richer ore.

"Truth Group.—Considerable work was performed on the Dacotah last summer, which is one of the principal properties of the Truth group. The work consisted principally of wide open-cuts running with the trend of the vein matter in magnetic ore and carrying small values in gold, copper and silver. In one of the cuts a good showing of copper was exposed, which will be further developed next season. All of the ore mined was sold to the Iron Mask Company for fluxing purposes. The Truth group is one of the mineral properties on Coal Hill and contains some of the best ore deposits.

"Pot Hook.—Mr. Ashby, the former manager of the Pot Hook, informs me that instructions have been received from England to resume work on that mine, which has lain idle for several years.

"Cotton Belt Mines.—The Cotton Belt mines are situated on Grace Mountain, about 10 miles in a straight line northeast of Seymour Landing, at the head of Seymour Arm. The following work has been performed on the claims mentioned: Cottonwood, an open-cut and shaft 20 ft. deep; Joe, shaft 10 ft.; Boyne, shaft 12 ft.; Harrison, shaft 10 ft.; Victoria, open-cut, shaft 20 ft., and lode stripped for a considerable distance; Jessie, vein stripped; Wellington, cross-cuts; Shory, cross-cuts; Leemitford, cross-cutting on vein; Black Prince, two large open-cuts; Tartar, open-cut 30 ft. long; McLeod, shaft 12 ft.; Horseshoe, shaft 10 ft. The ore bodies show an increase in value as depth is obtained. I am informed that two new veins were discovered last summer. They exist in different formations, and are dissimilar in the character of the vein matter. One of them, 70 ft. wide, contains chalcocypite; the other, 10 ft. wide, is composed of galena, grey copper and chalcocypite. F. Daniels, manager of the Cotton Belt group, reports having found a vein of molybdenum of a promising character, which has returned high assays in that metal and 10 oz. in silver. The gravel in Cotton Creek contains both gold and platinum, but not in sufficient quantity to pay to work.

"The amount granted by the Government for the construction of a trail has been a great assistance to prospectors.

"Coal.—A local company of Kamloops business men, which acquired 2,500 acres of coal lands bordering the railway track and extending up the mountain side, commenced drilling operations last fall at a point about six miles west of Kamloops, designated

by the late Dr. Dawson as being in line with the strike of the coal belt, and offering advantages for the prosecution of the necessary work. A Calyx drill, which cuts a core two inches in diameter, was purchased from the Canadian Rand Drill Company, of Sherbrooke, Quebec, and installed last fall, and has performed efficient work with a much smaller expenditure than if done by means of a diamond drill. The depth attained is 375 ft., represented by 200 ft. of rock, geologically termed as belonging to the Tranquille bed, 100 ft. of conglomerate, and 25 ft. of shale. The cold weather caused a suspension of operations during the winter, but preparations are now in course of progress to resume drilling. It is not expected that the coal seam will be encountered before reaching a depth of 500 ft."

OTHER MINING GROUPS.

The mining recorder reported:—

"Aspen Grove Camp.—The largest number of mineral locations is in the Aspen Grove camp, of which several groups have been Crown granted. About nine years have elapsed since prospecting work was begun in this section, and up to date few claims have changed hands. Efforts are now confined chiefly to keeping up assessment work and Crown granting.

"The Golden Sovereign group, which makes a strong showing of native copper, was bonded last March. Development work was engaged in and a shaft was sunk to the depth of 100 ft.

"The Copper Standard group of claims, owned by Price Ellison and others, contains copper ore with appreciable values in gold and silver. Work was done on the Bighorn and adjoining claims, enhancing the value of the property.

"On the group of claims owned by Dad Allen, assessment work resulted in copper glance, chalcocypite and bornite being exposed. Locations held by Roberts & Budd, on which prospecting has been done, afford excellent showings. Some good exposures are to be found on the Tom Cat group, where several strong showings of native copper are in sight.

"Bates Bros. & Armstrong, who were among the first prospectors in the camp, have several groups of properties, on some of which considerable development work has been done.

"Disclosures on the Wayside group, owned by Leonard Adams, resulted in good showings.

"The Broomhead group, owned by the Broomhead Syndicate, has attracted attention on account of the ore exposed by assessment work on some of the properties. Work done in this camp during the last two years has resulted in favourable disclosures, both as to permanence of veins and values of ore bodies. An open cut on the property of the Broomhead Syndicate exposed the lead, which is 15 ft. wide with two well-defined pay shoots of high-grade copper ore, with small gold and silver values. In an old tunnel a station was cut and winze sunk 15 ft. on the larger pay shoot, which is several feet wide.

"Work on the Cowboy claim, owned by the same

company, has disclosed a vein of ore of excellent indications.

"On the Coronado mineral claim a lead about 12 ft. wide, which seems well mineralized, has been discovered.

"A large body of medium grade copper ore is in evidence on the group of claims owned by Mr. Sissett and others.

"Locations held by J. W. Collis and associates were favourably mentioned in previous reports, and subsequent work strengthens the conviction. H. Stumbles & Co. have a large orebody in sight, containing copper pyrites, which give excellent assay values.

"The extension of the railway into Nicola brings the 10-Mile camp within 12 miles of shipping facilities, with a down-grade to the station.

"Mill Creek.—On Mill Creek, about three miles north of Nicola, Thomas Hunter has a group of several claims, gold and copper bearing. The ledge matter is white quartz and the formation granite. Frank Lambert has five claims, on which several years' assessment work has been done. Assay values from both properties are good.

"Coal Prospecting.—During the last three years a considerable amount of prospecting with diamond drills has been done. The Diamond Vale Coal and Iron Company has been operating extensively with the drill on its coal areas in the Quilchena basin, and recently on its Coldwater property. The disclosures on Quilchena were satisfactory, but too remote from a railway for present shipment of coal. This company secured a large area of the best coal lands in the Nicola and Coldwater basin, through which the Canadian Pacific railway branch line passes. After several drill tests, which resulted favourably, the company selected a colliery site, and things are now in preparation for the opening up of these properties. All the work is done substantially and with a view to permanency. Everything is now ready for shaft-sinking, and, as the depth of the first seam is comparatively small, the company hopes to have an output of coal at an early date.

"The Nicola Valley Coal and Coke Company (locally known as the Garesche-Green), also located on the Coldwater, has a large coal seam to start on, an outcrop on the hillside of a good quality of coal, which can be worked by tunnelling. Under the efficient management of Alex. Faulds, M.E., this property is being prepared for coal shipment. The local demand has been fully supplied; also the Canadian Pacific railway engines on the Nicola branch are supplied with coal from the tunnel output. A car is being loaded for shipment to Vancouver. Counting the different seams known to exist on this property, there is fully 18 ft. thickness of coal accessible by tunnel. The work so far has been chiefly exploratory and preparatory; but as soon as proper shipping facilities shall be provided the company expects to have an output equal to the demand."

BRITISH COLUMBIA BUREAU OF MINES.

Review of Work of the Year 1906.

THE BUREAU OF MINES regularly and systematically performs important duties in connection with the mining industry of British Columbia. The following summary of its work during the year 1906 has been taken from the "Annual Report of the Minister of Mines," lately published:

The work of the Bureau of Mines increases, of necessity, year by year, and this growing activity is due to the following causes: The extension of the mining area of the Province, with the proportional increase in the number of mines; the increasing desire of the outside public for the free information which the bureau supplies with regard to the various mining districts and camps; and the appreciation by the prospector of the fact that he may obtain, gratis, a determination of any rock or mineral which he may send to the bureau.

The routine work of the office, and the preparation and publication of the "Annual Report" for the year just ended, followed by the examination in the field of as many of the mines and mining districts as the season would permit, together with the work of the laboratory and instruction of students, fully occupied the staff for the year. The staff of the bureau consists of the provincial mineralogist, the provincial assayer, and a junior assistant in the laboratory, with a clerk as temporary assistant during the publication of the Report.

Provincial Mineralogist.—After the publication of the "Annual Report" for the previous year and the finishing of office work, the provincial mineralogist, early in June, made a trip to the vicinity of Cowichan Lake, visiting there such mineral claims as had had any material amount of work performed on them, and making a report on the same. A report was also made as to the necessity for and the best route to be followed for a trail into certain claims situated on the Nanaimo River. The field-work to be undertaken during the summer months by the bureau was then planned and preparations for the main summer trip of the provincial mineralogist made.

On July 12 the provincial mineralogist, acting under instructions of the Hon. the Minister of Mines, started on a trip to the valley of the Peace River, east of the Rocky Mountains and west of the 120th meridian, the provincial boundary between the 54 deg. and 60 deg. north latitude. The reports of rich finds of gold, and also of coal, in this district, combined with its agricultural possibilities, on all of which the Government had no authentic information, and the fact that this was a proposed route of the Grand Trunk Pacific railway across the Province which seemed most likely to be followed, rendered an early report on this district very desirable.

The route chosen was to go up the Skeena River from Essington to Hazelton; thence by pack-train to Babine Lake, portaging to Stuart Lake, and thence

EXAMINATIONS FOR ASSAYERS.

Report of the Secretary of Board of Examiners.—I have the honour, as secretary, to submit the Annual Report of the Board of Examiners for Certificates of Competency and Licence to Practice Assaying in British Columbia, as established under the "Bureau of Mines Act Amendment Act, 1899."

The act requires that at least two examinations shall be held each year, and such have duly taken place. Both were held in the Government laboratory at Victoria, each occupying a week; the first examination was begun on April 23, and the second on December 3, 1906.

At the first examination the board consisted of the provincial mineralogist, the provincial assayer and Thomas Kiddie, and at this examination five candidates came up, of whom four passed, only one failing. At the December examination, the board consisted of the provincial mineralogist, provincial assayer and D. E. Whitaker, at which 12 candidates stood for examination and seven successfully passed.

The question of holding the autumn examination at Nelson was thought of, providing a sufficient number of candidates from the upper country entered for examination. Advertisements were inserted in the Kootenay newspapers, giving notice of such intention and calling for entries, but no sufficient number applied to justify the considerable additional expense entailed by holding an examination away from Victoria.

In addition to the 12 candidates mentioned above, who successfully passed the examinations, the board recommended during the year the granting of two certificates by exemption, under sub-section (2) of section 2 of the Act. In accordance with these recommendations, all these 14 certificates have been duly issued by the minister of mines.

EXAMINATIONS FOR COAL MINE OFFICIALS.

During the year 1904, under the "Coal Mines Regulation Act Further Amendment Act, 1904," the regulations regarding the qualifications and examinations of officials employed in coal mines have been completely revised and at the same time made much more stringent and thorough.

The "Coal Mines Regulation Act," as now amended, provides that all the officers of a coal mining company having any direct charge of work underground, shall hold Government certificates of competency, which are to be obtained only after passing an examination before a duly qualified board, appointed for the purpose of holding such examinations, and known as the Managers' Board. The certificates granted on the recommendation of such board, and the requirements for same, are as follows:—

First Class (or Manager's) Certificate.—Such a certificate must be held by every manager or "chief officer having the control and daily supervision of any coal mine" in British Columbia. The statutory requirements for this certificate, in addition to such examination and qualifications as may be imposed by the board of examiners are, that the candidate for examination shall be at least 25 years of age, a British subject, and have had at least five years'

experience in or about the practical working of a coal mine.

Second Class (or Overman's) Certificate.—Such certificate must be held by any person "who has the daily charge of the underground workings of a coal mine under the control and daily supervision of the manager, and next in charge under such manager."

Aside from the requirements of the Board of Examiners, a candidate for such certificate must have had "at least five years' experience in or about the practical working of a coal mine."

Third Class Certificate.—This certificate must be held by every shiftboss, fireboss, or shotlighter in a coal mine in British Columbia, and besides the examination by the board, calls for three years' practical experience.

Experience in a coal mine outside the Province may be accepted by the board. Any certificate is considered to include that of any lower class.

In addition to the examinations and certificates already specified as coming under the Managers' Board, the act further provides that every coal miner shall be the holder of a certificate of competency as such. By "miner" is meant "a person employed underground in any coal mine to cut, shear, break or loosen coal from the solid, whether by hand or machinery."

Examinations for a miner's certificate are held each month at each colliery by a Board of Examiners, known as the Miners' Board, and consisting of an official appointed by the owners, an examiner elected by the miners of that colliery, and an examiner appointed by the Government.

Report of Secretary of Board of Examiners.

I beg to submit the annual report, covering the transactions of the above board, appointed under the "Coal Mines Regulation Act."

The period intervening between the holding of the last examination and the previous one was longer than usual, and the number of applicants was in consequence greater. The board possesses no definite means of ascertaining when these examinations should be held, in order to enable intending candidates to present themselves for examination without unnecessary delay, and the board has hitherto been governed in this matter by the response to the previous examination.

While it is the desire of the board to hold examinations sufficiently often to fully meet the requirements of the "Coal Mines Regulation Act," it should be stated that the necessary arrangements and preparations required to hold such examinations simultaneously over so large an area, embracing as it does, coal mining centres 800 miles apart, necessitates work of some magnitude, and the fixing of dates for holding these examinations should, and does, receive the careful consideration of the board.

In order that intending candidates may have ample time in which to prepare for examination, the board now publishes notices of examination intended to be held fully three months previous to the date set for such examination. The last examination was held simultaneously at Nanaimo, Fernie and Cum-

berland, on October 23, '91, and 25.

The examiners were as follows:

Nanaimo—Charles Graham, Elijah Priest and F. H. Shepherd.

Fernie—John John and R. G. Drinnan.

Cumberland—A. Dick, John Matthews and Tully Boyce.

The following candidates, having earned the necessary percentages, were recommended to receive first, second or third class certificates accordingly:

First Class—Thos. H. Williams, Thos. France and John K. Miller.

Second Class—Bernard Canfield, John Newton, James Derbyshire, Edward Budge, William Lockhart, Thomas M. McGuchie, John Gillespie, David McKinnel, Joseph D. Thomas and John C. Brown.

Third Class—D. B. Douglas, William Merrifield, Samuel K. Mottishaw, William Stockwell, George Merrifield, James M. Stewart, Edward Devlin, George Moore, William Lancaster, Samuel Richards, William Watson and John White.

Regarding the nature of the examinations, the board regrets that it was unable to procure suitable apparatus in time to submit the "sight test" suggested in previous report, but acknowledges with thanks the valuable information received upon the subject from James Ashworth, The Cassels, Old Colwin, England, who describes, with drawings, a very efficient apparatus for testing mine officials in the detection of small percentages of gas by safety lamps; also from J. T. Beard, principal of the Seranton School of Mines (Coal Min. Div.), for valuable suggestions upon the same subject, accompanied by his valuable pamphlet upon the "Detection of Small Percentages of Gas by the Safety Lamp." Also suggestions kindly sent by E. Gilpin, inspector of mines, Works and Mines Department, Halifax, Nova Scotia.

The board will endeavour, at its next examination, to install the requisite apparatus and submit to each candidate this very important and necessary test.

The by-laws of the board prohibit the use of textbooks and of written or printed formulæ at the examinations, and this question has been brought to the attention of the board by a pertinent circular letter issued by J. T. Beard, and addressed to "State Examining Boards for Mine Foremen, Firebosses and Engineers," a copy of which was forwarded by the author to this board.

The question has from time to time received the consideration of the board, and it is probable that the matter will be taken up at its next general meeting. Giving as an example a long, complicated numerical calculation, Mr. Beard comments as follows:—

"If this question came up in the office, or was worked out by the candidate at home, he would naturally refer to his handbooks and find the formula that he required to make the calculation, and in a few minutes he would arrive at the correct answer.

"No one expects a practical man to remember rules, formulæ, etc., that are required in such numerical calculations, and, except when a candidate is

preparing for these examinations, he cannot, though of numerous such formulæ, imagine to himself where he can find them when required.

"I think we will agree with him that the purposes of any examination should be: first, to show the candidate's practical knowledge and acquaintance with mine-work of every description, and the laws, conditions and requirements in any way affecting the work; and, second, to show his capability for making necessary calculations.

"A man may understand how to solve the hardest theoretical questions, and yet, without practical experience, he would be incapable of holding any position of responsibility in mining operations."

Mr. Beard has given this question much consideration, and in this connection I may say that the recent efforts of the board have been to render the British Columbia examinations more practical, and to eliminate the ultra-academic feature, tending towards furnishing coal mine officials of greater practical experience, and thus making for greater safety to life and property.

The Board of Appointment of Examiners consists of: Andrew Bryden, Ladysmith, chairman; Tully Boyce, Nanaimo, vice-chairman; T. R. Stockott, George Williams and A. Dick, Nanaimo; R. G. Drinnan and John John, Fernie; F. H. Shepherd, Nanaimo, secretary. The office of the board is in the Provincial court house building, at Nanaimo.

Cobalt silver miners are on strike for higher wages and shorter hours.

In six years the use of portland cement in Canada has increased between three- and four-fold. In 1901 the estimated consumption was 872,966 bbl.; in 1906 it was 2,814,267 bbl.

The Rand gold companies of South Africa paid dividends during the year 1906 to the amount of \$27,086,838. This constitutes a record. The total dividends paid since the South African war, says *Reuter*, amount to \$97,855,432.

The mining tax bill recently passed by the Ontario Legislature provides for a tax of three per cent. on all profits of mines in excess of \$10,000 a year, and

lands in unorganized districts. The lands in organized municipalities were already liable to assessment for municipal taxation. Another measure affecting mineral lands was introduced, this dealing with a large class of holdings in the settled districts in

ing the mineral. The latter, when undeveloped, has escaped taxation, all taxes having been levied on the owner of the surface. An amendment to the law was introduced making the mineral rights assessable. This was regarded as too sweeping, and likely to discourage investment; it was subsequently modified so as to make it applicable only to "petroleum rights" instead of "mineral rights" generally, in which form

COMPANY MEETINGS AND REPORTS

YMIR GOLD MINES, LIMITED.

The first annual general meeting of the Ymir Gold Mines, Limited, was held in London, England, on July 2, Mr. Oliver Wethered (chairman of the company) presiding.

The secretary having read the notice convening the meeting and the auditors' report,

The chairman said: "Gentlemen,—I need hardly tell you that the period covered by the report has been an extremely trying one, after a time of great prosperity, because in the early days the Ymir Company, as the older shareholders know, was very prosperous. The company met with a series of misfortunes which taxed the patience of the shareholders and the abilities of the directors to a very great extent, and at one time reconstruction or liquidation was imminent. Happily, however, this was averted, and thanks to our getting into communication with Mr. Morland Hughes, he, through his Canadian connexion, was able to get accurate and satisfactory information about the Ymir mine, and we were able to raise, on very satisfactory terms, £40,000 worth of debentures. As the result of obtaining these funds, we were able to at once take in hand important development work and certain alterations in connection with the machinery which were recommended by Mr. Gilman Brown in a report which was sent to the shareholders. These recommendations have been carried out as rapidly as possible, and I am glad to say so far with extremely satisfactory results. Dealing first with the machinery, I may say that one of Mr. Brown's recommendations was that our large compressor should be moved to a site which would render us practically free from fuel bills in the future. It involves a considerable time and some cost, but I have no doubt the saving effected will amply cover the amount involved in such expenditure, and, moreover, in future not only shall we save the actual cost of fuel, but we shall deal with a problem that was getting a very difficult one. At a mine like the Ymir, each year the forests are denuded and the supplies of timber are more difficult to obtain, also they naturally cost more because of the longer distance to bring them. And in a climate like that of British Columbia there is comparatively a short period in the year during which timber can be transported from the forests to the mine. So difficult had this become that we were making tests of coal, which was obtained from 300 miles away from the Crow's Nest Pass collieries, and although there would have been a little saving there, the railways of Canada are so taxed by the wonderful demand on their rolling stock that on several occasions we were seriously delayed by the non-delivery of coal; therefore, in now making ourselves independent of fuel, we have accomplished a great deal. The developments carried on have been satisfactory, and we have gone through ore of a much higher grade than we had encountered for many months—I might say years—and when the mill is running I think the returns cannot fail to show very handsome profits. The first work to be undertaken was to give a second line of communication between the 700-ft. and the 1,000-ft. levels, because hitherto there was only the one means of communication, and it was difficult to keep apart the good and bad ore, or country rock. Some of the very disappointing results in the past were not, in Mr. Brown's opinion, because we had not good ore to crush, but because, unfortunately, it was impossible to keep the good ore from the bad, and therefore the net result obtained was such as to render the profits very small, if anything.

"It is a great disappointment to me not to be able to tell you today that the mill is actually running, but there have been some unfortunate difficulties. We now have the authority of the manager in a cable received today to say that it will be running not later than July 15. With regard to the nature of the ore we are going to crush, it is a little difficult, and, in fact, perhaps it would be dangerous to attempt to tell you what that grade of ore will be, or what quantity we shall supply to the mill in the early days, but, speaking generally, it

is a much higher grade than we have crushed for a long time past, and I think we may safely reckon on keeping from 15 to 20 stamps running, gradually getting up to our capacity of 40 stamps, and I trust ultimately running 80 stamps as we did in the old days. If we could run 80 stamps on ore from the old Ymir mine I have no doubt the results would be as satisfactory as in the old days; but we have a second string to our bow, which is a very important factor when dealing with large quantities, and this is the new vein. The ground of our faith in ultimately finding this new vein is the fact that there was, over a large area, rich float discovered. It was a mass of rich rock evidently shed from a vein in the neighbourhood, because it was not weather worn, nor did it bear any indication of having travelled any considerable distance. Again, it was more or less parallel with the outcrop of the Ymir vein, and this to an expert like Mr. Gilman Brown, and to myself, who have seen a good many mines, indicated that it was much more likely to be ore matter from a permanent vein, inasmuch as it was across the line of fracture of the stratification of the country. Before Mr. Nichols, our manager, went to British Columbia Mr. Gilman Brown very thoroughly explained to him various reasons on which he based his opinion that this new vein would ultimately be found, and, working on this information, and supplementing it by his own observation, two months ago Mr. Nichols cabled over that he was quite satisfied, or rather had very great confidence, that within the next two months he would locate that vein. These two months have hardly elapsed, but we have a cable this morning to say that in one of the exploratory drives he has quartz stringers coming in, and this, you may take it, is an indication that we are approaching—I only say an indication—that vein, and he adds that within the next 50 ft. he hopes to prove what he describes as his theory. Now, if he is not interrupted by anything unexpected, certainly within 14 days, and possibly within seven days, he should cut that lode; and if that lode is at all of the character which the outcrop indicates, we have, quite apart from the old Ymir vein, a second string of very great value. In conclusion, I may, perhaps, deal now with the resolution which will be submitted for your approval after this meeting is closed. It is to give effect to the arrangement made with the subscribers to the debenture issue and to create the shares which will enable them to exercise the option of converting their debentures into shares at par. With the shares standing in the market at 4s. or 4s. 6d., perhaps it does not seem to be a matter to consider very seriously, but it was part of the arrangement made, and those who subscribed to the debentures, remembering that these shares once stood at considerably over £2, regard the option as a valuable one, and naturally look to the company to give effect to the undertaking of the directors. With these remarks I formally move the adoption of the report."

Mr. C. M. C. Hughes seconded the motion, which was carried unanimously, and Mr. Oliver Wethered was re-elected a director.

Messrs. Monkhouse, Stoneham & Co., were re-appointed auditors.

At an extraordinary general meeting, afterwards held, a resolution was passed authorizing the directors to increase the capital of the company to £250,000 by the creation of 50,000 shares of £1 each.

NORTH STAR MINING COMPANY, LIMITED.

The following report of the directors of the North Star Mining Company, Limited, manager's report and statements of accounts for the year ended May 31, 1907, were submitted at the eighth annual meeting of the company held in Montreal, Quebec, on June 26, ulto:—

DIRECTORS' REPORT.

"The operations of the year have resulted in a net profit of about \$27,000. This is due to the mining and shipment of about 1,600 tons of ore, and the high prices of lead and silver prevailing throughout the year.

"The results of the work done early in the year were so favourable as to warrant prospecting the above ground at depth. For this purpose the Kellogg shaft was pumped out and the old west cross-cut at the 200-ft. level was extended 171 ft. to reach the desired ground, also a drift was run north for 85 ft.; but the work in this ground proved disappointing at this level although the rock was fairly well mineralized in places. It was decided that some further prospecting of this area should be done, chiefly to the north, by means of the diamond drill. Drilling for that purpose was begun on May 27. Judging from the work done in the main drift and the good surface showings, it is difficult to believe that ore does not exist somewhere in this locality.

"The buildings are in good repair; the steam plant is in good condition; the tramway is also in fairly good condition. "In conclusion I beg to call your attention to the ore shipped during the year. The contractors decided to give up their contract, and giving the three months' notice required, ceased work in August. The company is again working the old mine, six men being employed, and meeting with good results. "The net returns for ore shipments for the year amount to \$33,000."

MANAGER'S REPORT.

"Prospecting has been carried on to the north and west of the Kellogg shaft and amounts to 558 ft. in sinking, drifting, cross-cutting and raising.

"The results from the work done early in the year were so favourable as to warrant prospecting the above ground at depth. For this purpose the Kellogg shaft was pumped out and the old west cross-cut at the 200-ft. level was extended 171 ft. to reach the desired ground, also a drift was run north for 85 ft.; but the work in this ground proved disappointing at this level although the rock was fairly well mineralized in places. It was decided that some further prospecting of this area should be done, chiefly to the north, by means of the diamond drill. Drilling for that purpose was begun on May 27. Judging from the work done in the main drift and the good surface showings, it is difficult to believe that ore does not exist somewhere in this locality.

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"The net returns for ore shipments for the year amount to \$33,000."

STATEMENTS OF ACCOUNTS.

Assets.

Mines, mineral claims and assets.....	\$1,258,568 96
Development and prospecting for year ending May 31, 1907.....	15,505 58
	<hr/> \$1,274,074 54
Permanent equipment	40,166 86
Office furniture	393 02
Mine supplies and stores on hand.....	2,290 29
Accounts receivable	5,847 20
Cash on hand and in banks	63,222 74
	<hr/> \$1,385,894 65

Liabilities.

Capital Stock	\$1,500,000 00
Less in Treasury	200,000 00
	<hr/> \$1,300,000 00
Profit and Loss	85,894 65
	<hr/> \$1,385,894 65

Working Account.

To balance at credit of Profit and Loss, May 31, 1906	\$27,380 98
Ore tax	633 15
General expense	2,876 18
Written off permanent equipment.....	4,455 04
	<hr/> 27,380 98
By balance transferred to Profit and Loss.....	27,380 98
	<hr/> \$55,177 64
To Profit and Loss.....	\$55,177 64
Ore in transit	3,000 00
Miscellaneous receipts	2,336 04
	<hr/> \$5,177 64

Profit and Loss.

To balance May 31, 1907	\$85,894 65
	<hr/> \$85,894 65
By balance at credit of Profit and Loss, May 31, 1906	\$58,513 67
By balance from Working Account	27,380 98
	<hr/> \$85,894 65

COMPANY CABLES AND NOTES

CABLES.

British Columbia.

Le Roi.—June: Shipped from the mine to Northport during the past month 11,722 tons ore, containing 2,368 oz. gold, 4,450 oz. silver and 242,300 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, \$2,000. Expenditure on development work during the month, \$9,000.

Shipped 1,740 tons. The net receipts are \$24,236, being payment for 2,188 tons shipped, and \$1,341, being payment for 98 tons concentrates shipped, in all \$25,577. Report of Vancouver mine, Slocan: Shipped 83 tons. The net receipts are \$8,542, being payment for 100 tons concentrates.

Slough Creek.—"Outflow 890 gal. per min.; pressure No. 5 borehole 88 lb. and No. 10 borehole 94 lb. per sq. in." (Office note—The slight increase in pressure is consequent upon the melting snow which is usual at this season of the year.)

Slough Creek.—"Outflow, 969 gal. of water per minute; pressure No. 5 borehole, 85 lb.; No. 10 borehole, 92 lb. per sq. in." (Office note—The above outflow shows increase of 79 gal. per min.; the pressure a decrease of 3 lb. and 2 lb. respectively, on previous advice.)

Tyce.—June: Smelter run 22 days, treating 1,104 tons of Tyce ore; value, after deducting refining charges, \$13,000; 3,967 tons of custom ore; total 5,071 tons, producing in all 387 tons of matte.

crushed 22,397 tons ore. Estimated realizable value of bullion, \$31,039. Saved 425 tons sulphurets, estimated realizable value of same \$24,767. Working expenses for month, \$25,313. Labour conditions much improved.

300-stamp mill ran 26 days, crushed 76,139 tons ore; estimated realizable value of bullion \$81,696. Saved 1,446 tons sulphurets, estimated realizable value of same \$78,475. Working expenses for month \$81,614.

Alaska Mexican.—A dividend (No. 47) of 30 cents per share

has been declared by the Alaska Mexican Gold Mining Company, payable July 29; amount \$54,000, making total of dividends to date, \$1,626,381.

Alaska Treadwell.—A dividend (No. 77) of \$1 per share has been declared by the Alaska Treadwell Gold Mining Company, payable July 29; amount \$200,000, making total of dividends to date, \$9,435,000.

British Columbia Copper.—A dividend (No. 1) of 25 cents per share and a bonus of 15 cents per share, together 40 cents, has been declared by the British Columbia Copper Company, Limited, payable September 4. It is intended to pay a similar dividend regularly each quarter and, in addition, such bonus as the directors shall deem desirable.

Consolidated Mining and Smelting.—A quarterly dividend (No. 6) of \$2.50 per share has been declared by the Consolidated Mining and Smelting Company of Canada, Limited, payable August 1; amount, \$120,845, making total of dividends to date, \$714,945.

Crow's Nest Pass.—The dividend (No. 26) for the quarter ended June 30, ultimo, at the rate of ten per cent. per annum, paid in July by the Crow's Nest Pass Coal Company, Limited, amounting to \$87,500, brought the aggregate of dividends paid by the company during six and a half years up to \$2,018,648.16.

International.—A dividend (No. 3) of 1½ per cent. has been declared by the International Coal and Coke Company, Limited, payable August 1; amount, \$42,000, making total of dividends to date, \$98,000.

Le Roi No. 2.—An interim dividend of two shillings per share has been declared by the Le Roi No. 2, Limited. The aggregate of dividends paid by this company is now about \$780,000.

Tyce.—A dividend of one shilling and sixpence per share, being at the rate of seven and one-half per cent. per annum on its authorized capital of £180,000, has been declared by the Tyce Copper Company, Limited; amount £13,500 (\$67,500), making total of dividends to date, £58,500 (\$292,500).

NOTES.

The Wormald Creek Mining Company is sinking a shaft on Wormald Creek near Beaver Pass House, Cariboo. W. J. Gilman is manager.

Notice has been gazetted, under date June 28, 1907, that the Slough Creek, Limited, an extra-provincial company, licensed under the "Companies Act, 1897," on March 15, 1904, has ceased to carry on business within the Province of British Columbia, under its licence. A new extra-provincial company of the same name has been licensed.

The Ashcroft Journal states that the Slocan Cariboo Mining and Development Company is having a hard time while sinking on Canadian Creek on account of the volume of water being encountered at a depth of 17 ft. Beside the sinking of the shaft and installation of steam pumps and hoist, this summer's work includes the excavation of 2,000 ft. of ditch.

A. G. Hanauer of Spokane, and B. A. Laselle and R. H. Hanauer of Barkerville, directors of the Bear Hydraulic Mining Company, of Cariboo, met at Ashcroft recently. The business included consideration of plans for the erection of a new dam in place of that which lately broke away.

The Maple Leaf Mining Company, incorporated at Spokane, Washington, U.S.A., is capitalized at \$200,000. Its officers are: Alfred Coolidge, president; D. M. Drummell, vice-president; Aaron Kuhn, treasurer; Charles P. Lund, secretary, and E. Dempsey, manager. Coal properties near Bellevue, Alberta, have been purchased by the company, which is stated to have \$60,000 available for development work.

The Reward Gold and Silver Mining Company intends driving its tunnel further into the mountain on its property in Ferguson camp, Lardeau. When work was stopped last autumn a distance of about 1,300 ft. had been driven. An extension of 500 ft. was recently authorized, and the company's representative in British Columbia—F. C. Elliott of Trout Lake city—is arranging for the carrying out of this work.

The LaPlata Mines Company has had difficulty in obtaining teams to haul ore and concentrates to the mine shipping place a few miles up the west arm of Kootenay Lake from Nelson.

The Sullivan Group Company is shipping about 100 tons of ore daily to the smelter at Marysville. The ore is stated to carry about 10 oz. silver per ton, 25 per cent. lead, and 10 per cent. zinc. Some 50 men are employed at the mine and 100 at the smelter.

The Willow River Mining Company, which last season reached the deep channel of Willow River, is now reported as being on a producing basis and making a good recovery of gold.

COAL MINING NOTES.

It is stated that a 3-ft. seam of coal is being developed at Nanoose Bay, a few miles north of Nanaimo, Vancouver Island. Beside mining coal the owners intend making firebricks, there being two feet of good clay alongside the coal.

Another coal mining company has been formed—the Royal Collieries, Limited. The Barnes mine, situated five miles from Lethbridge, together with some 6,000 acres of coal lands, has been acquired. It is reported that a modern plant is to be installed and development work undertaken as soon as shall be practicable. It will be necessary to construct five miles of railway to connect with the Canadian Pacific Company's Crow's Nest line.

The Alberta Fuel Company of Spokane, Washington, is stated to be erecting in Spokane coal storage bunkers to have a holding capacity of 10,000 tons. This company has been organized to market southwest Alberta coal.

Land in the Crow's Nest Pass and Lethbridge districts—some 2,500 acres in the former and 1,400 in the latter—have been acquired by Chicago men from the Colfax Coal and Coke Company of Spokane and Colfax, Washington, U.S.A. The new owners are expected to shortly proceed with development work.

The Maple Leaf Mining Company has been incorporated in Spokane, Washington, to operate a coal property of about 700 acres situated in the Frank district, southwest Alberta. Connection with the C.P.R. Company's Crow's Nest railway is to be made near Bellevue.

The Nicola Coal and Coke Company is opening up two coal mines in the Nicola district. The Kamloops Standard says: In two weeks the C.P.R. will have completed a spur line from Merritt station, on the Nicola branch, into the coal lands of the Nicola Valley Coal and Coke Company and the mines will then be in a position to deliver coal to the C.P.R. cars. The company has two seams of coal about a mile and a half from Merritt station, which is seven miles this side of Nicola. On the 15-ft. seam a slope 800 ft. long has been sunk and a tunnel is now being driven on two ends which will open this slope out on the spur now being built. The tippie will be alongside the spur. Only 150 ft. of work in the centre now remains to be done to open this tunnel. On a smaller seam a slope is being driven, and it will also be open with a tunnel through which the coal mined will be brought out to the spur tracks.

On the payday for the month of June at the Crow's Nest Pass Coal Company's collieries the amount distributed was one of the largest monthly totals in the history of the company. The mines are now producing a large tonnage, but it is difficult to obtain additional men for mines and coke ovens, otherwise both would be worked to their full present capacity.

During July the Lille mine of the West Canadian Collieries, Limited, was closed down temporarily, the men having ceased work in order to compel the company to do away with the back-hand system that had been in force at this mine for two years. The difficulty has been temporarily adjusted and the men have returned to work pending adjudication of the point in dispute by an arbitration committee of miners and operators appointed as provided in the general agreement

made on May 4, 1907, between the Western Coal and Coke Association and the United Mine Workers of America.

An 11-ft. seam of coal has been struck by the prospecting party working for the Crow's Nest Pass Coal Company at Morrissey. The new seam is located close to the tipple but much lower down than the old seam. A contract has been let for a two-track tunnel and about 20 men are engaged in driving it.

Further development of the Canadian-American Coal and Coke Company's mine at Frank is being energetically proceeded with and efforts are being made to obtain 50 to 75 more men with the object of increasing the daily output of coal to 800 tons. Cross-cutting east and west of the seam heretofore worked will shortly reach two other seams and make more coal available.

GOLD BULLION RECEIPTS AT UNITED STATES ASSAY OFFICE, SEATTLE, WASHINGTON.

A summary of an official statement of the gold bullion deposited at the United States Assay Office, Seattle, during the fiscal year ended June 30, 1907, gives the following figures: Gold, standard ounces 1,228,742.875, coining value \$22,860,330.26; silver, standard ounces 196,858.70, coining value \$229,071.94; or a total value of \$23,089,402.20, as compared with the total of \$18,139,058.41 for the immediately preceding fiscal year. The sources from which the more recent year's bullion receipts came were as follows:

Alaska	\$15,791,434.37
Canadian Yukon	5,995,837.45
British Columbia	1,190,547.72
All other	117,582.66
Total	\$23,089,402.20

MACHINERY AND CONSTRUCTION NOTES.

It is stated that the Dominion Copper Company is preparing to install a two-stand copper converting plant at its smelting works at Boundary Falls in the Boundary district.

The Nelson Iron Works has received an order for a complete tramway to be erected by the Consolidated Mining and Smelting Company of Canada at its Eureka-Richmond mine near Sandon, Slovan district.

The Grand Forks Gazette says that in five days the Machine and Structural Iron Works of that town made a receiver for the large blast furnace recently completed at the Dominion Copper Company's smelter at Boundary Falls.

The Bear Hydraulic Mining Company has cut 60,000 ft. of lumber for use in renewing its dam which recently broke away with the loss of the water intended for this season's hydraulicking.

The 450-h.p. electric motor previously used in running the War Eagle compressor, and latterly a portion of the Centre Star compressor plant at Rossland, has been shipped to Phoenix where it will drive the Snowshoe compressor plant. A motor of 600 h.p. has been ordered from the Canadian Westinghouse Company and it is expected it will reach the Centre Star mine in the course of a few weeks. In the meanwhile the Nickle Plate compressor will be used.

Grading of Great Northern railway one and a half-mile spur to Granby Company's new Victoria shaft terminal, at which ore bunkers have been so arranged as to admit of loading on to either Great Northern or Canadian Pacific trains, is finished and laying steel commenced. Construction of a trestle 300 ft. long and 50 ft. high is necessary to complete the new railway connection.

Connection between the Cariboo Gold Mining Company's old reservoirs and big hydraulic mine near Quesnel Forks having been restored, the construction of the Spanish Lake water system has been suspended. The manager, John B. Hohson, has left Bullion for New York. Meanwhile hydraulicking is in progress at the mine.

The Le Roi No. 2, Ltd., of Rossland, has ordered a 20-ft. Walker "Indestructible" ventilating fan for a 20-ft. drill air compressor together with an impulse water wheel for a 20-ft. mill on Kootenay Lake. A 5-ft. standard, 40-mesh, Huntington mill, to run parallel with a tube mill, is also being obtained for the Blue Bell mill.

The Pacific Coal Co. of Bankhead, Alberta, has ordered a 20-ft. Walker "Indestructible" ventilating fan.

The Crow's Nest Pass Coal Company is adding to its plant and machinery two Walker compound condensing Corliss two-stage air compressing engines each having a capacity of 3,500 cu. ft. of free air per min.; also a 20-ft. Walker ventilating fan driven by a tandem compound engine.

The Le Roi No. 2, Ltd., of Rossland, has ordered two Hadfield's patent steel ore crushers, which are under construction.

TRADE NOTES AND CATALOGUES.

Hadfield's patent stone breakers and ore crushers are steadily growing in favour in Canada. Beside the one described in last month's *MINING RECORD* two for the Le Roi No. 2, Limited, of Rossland, B.C., and two for the Mond Nickel Company's Victoria mines in Ontario, are in course of construction at the East Heekle Works, Sheffield, England, of Hadfield's Steel Foundry Company, Limited. Peacock Brothers of Montreal, sole Canadian representatives of Hadfield's, have reason to expect that they will shortly secure other orders for this make of rock crushers.

Mussens Limited of Montreal is doing a steadily increasing business in the Canadian Northwest in the supply of mining, railway, contractors', and municipal supplies. J. W. Collis, of Rochussen and Collis who have charge of the company's Vancouver branch, is kept almost constantly moving about the large area of territory he has to cover, with increasingly good results in orders obtained. The company has lately published a very useful catalogue (No. 15) of 640 pages, size 8x5 in., bound in cloth, freely illustrated, and having a full index for convenience in referring to particular manufactures or supplies. It is as comprehensive as space limits have allowed, and conciseness and simplicity are its prominent features. Code words and figure numbers admit of reference being made clearly and with least possible chance of error, while an abridged code, in conjunction with the other code words, will prove of much assistance to those ordering by telegraph. The publication of this catalogue is in keeping with the company's up-to-date general methods in carrying on its extensive business.

The Canadian Westinghouse Company's circular No. 1084, "The Westinghouse Series-Alternating Arc Light System," has been received. This pamphlet shows the Westinghouse system to be distinctive in its features of design and construction, and superior in its operation, representing, in all points, years of experience, investigation and development in the field of manufacture of electrical apparatus. Illustrated descriptions are given of various arc lamps, and accessories.

Bulletin No. 30 of the Canada Foundry Company, Limited, Toronto, Ontario, deals chiefly with gate valves and hydrants, both of which are described and illustrated in variety. Tables of dimensions and other useful information are included.

The Westinghouse Electric works at East Pittsburgh, Pennsylvania, have established a new record. During the month of May the company shipped 750 carloads of electrical machinery, or an average of nearly 30 carloads each working day, aggregating 10,000 tons and representing in value about \$4,000,000. This exceeds by 110 cars any shipping record for one month ever previously made at these works. The high record heretofore was held by the month of August, 1906, when 640 carloads were shipped. The shipments at the Westinghouse Machine Company's shops during May also reached high-water mark, the company having sent out from its works 90 engines, aggregating 50,000 h.p. These engines included gas engines from 10 to 1,000 h.p. and steam turbines from 1,000 to 10,000 h.p.

PRODUCTION OF LEAD.

Official returns of the output of metallic lead in British Columbia for the fiscal year ended June 30, last, give a total of 23,754 tons. Of this quantity 18,494 tons were the product of ores and concentrates smelted in British Columbia, while 5,260 tons were contained in shipments to American and European plants. More than half of last year's lead product was from the Consolidated Mining and Smelting Company's St. Eugene mine, the output of which was 14,719 tons. The Sullivan group mine, also in East Kootenay, produced a considerable portion of the remainder of the total output. The totals of four consecutive years were as under:

Fiscal Year.	Tons of Metallic Lead.
1903-4	12,163
1904-5	27,838
1905-6	26,111
1906-7	23,754

BOOKS, ETC., RECEIVED.

Brooks, E. W.—A report on the geology, mineralogy and metallurgy of the London-Arizona copper mine, with map and cross sections from the U. S. Geological Survey, showing its genetic relations to other great copper deposits of laccolitic origin.

Columbia University, New York City.—The "School of Mines Quarterly." Vol. XXVIII, No. 3.

Guarini, Professor.—"The Water Powers of Peru—their Development and Possible Applications." Abstract from the *Engineering Magazine* of an article (by Mr. Guarini, professor of physical and electrical science at the "Escuela de Artes y Oficios" of Lima, Peru), the purpose of which is to describe the amounts and relative locations of the water-powers of southern Peru, the feasibility of their development, demand for power, possible application of electricity, etc.

California State Mining Bureau.—An "Act Establishing a Uniform System of Mine Bell Signals." Lewis E. Aubury, state mineralogist, Ferry Building, San Francisco. Price, cardboard 5 cents, paper 2 cents, postage 2 cents.

Dundee Free Libraries, Scotland.—Report of the Free Library Committee to the Town Council of Dundee for the year 1906. Pages, 44; illustrated.

Cobalt Mining Information Bureau, Limited.—Morton's "Hand Book of the Cobalt District"; map of Bucke Township, including section of Lorrain Township; map of Coleman Township. All published by the Cobalt Mining Information Bureau, Limited, Toronto, Ontario.

Poole, H. S.—"Features of the Continental Shelf off Nova Scotia." By Dr. H. S. Poole, Halifax, N.S. From the "Transactions of the Royal Society of Canada," Second Series, 1906-1907.

Zentrale für Bergwesen, Frankfurt am Main.—Report for 1906 of the Central Mining Institute, Frankfurt-on-the-Main, Germany.

American Institute of Mining Engineers.—Bi-Monthly Bulletin of the A.I.M.E., for July, 1907. Contents: I. Institute Announcements; II. Technical Papers.

BOOKS REVIEWED.

Gold Dredging, by Capt. C. C. Longridge, mining and consulting engineer. 313 pages, 6x9½ in., illustrated. Published by *The Mining Journal*, London, England. Second edition; cloth, £1 net.

This volume, "Gold Dredging and Mechanical Excavators," is a second and revised and greatly enlarged edition of Captain Longridge's previously published work on "Gold Dredging." Much additional matter has been incorporated in the new edition, and the arrangement of the work has been considerably altered. Its 34 chapters cover a wide field, and deal successively with the various kinds of dredges in use,

horse-power required in dredging, separation of the material dredged, gold recovery appliances, quantity of water required for washing the gold-bearing gravel, disposal of tailings, working costs, capacity and costs of dredges, difficulties of dredging, selecting and prospecting dredging ground, dredging leases, power excavators, fields for gold dredging, and the author's conclusions regarding this increasingly important industry.

It is claimed for this book that it retains its character as a practical treatise and, while omitting theories and untried inventions; records as faithfully and impartially as possible known gold-dredging practice and well-tested methods. It shows that of late there has been general development in dredges and their fields of operation, with the result that the facts have been brought into greater prominence that ground of abnormally low gold value can now be profitably treated, and that an enormous area of such ground remains to be exploited. Further, failures have been fewer and wherever dredging has been undertaken with prudence and skill there has been success in greater degree. In dredge building there has been all-round improvement in details of hull and machinery; design and construction have been bettered, and strength and durability increased.

Among the known dredging fields noticed are those of British Columbia and Yukon Territory. Information relating to the former has been extracted from articles published in the *MINING RECORD* and other journals, and to the latter from the "Interim Report of the Commissioner of the Yukon Territory" made by Commissioner McInnes on December 15, 1906. While the general results of dredging in British Columbia since the publication of the articles quoted from have been disappointing, the experience in the Yukon has been encouraging enough to induce the bigger operators to considerably extend for gold on a much larger scale than heretofore seen in the Canadian Northwest.

Captain Longridge's efforts to bring his book up to date will be appreciated by many interested in gold dredging. The making conveniently accessible of so much information on this very important subject should have the effect of leading to a ready sale of this comprehensive work, which in addition to the large fund of information it contains, possesses the merit of having been well printed, excellently illustrated, neatly bound, and generally got up in an attractive style.

Examination Questions for Certificates of Competency in Mining, by the editors of *Mines and Minerals*, Scranton, Pennsylvania, U.S.A. 532 pages, 6x8¾ in., illustrated. Published by the International Textbook Company, Scranton, Pa. Cloth, \$3.50.

This book contains examination questions for competency as mine inspector, mine manager, mine foreman, fire-boss, hoisting engineer, etc., as given by the state examining boards, together with answers prepared and edited by the editors of *Mines and Minerals*, a journal devoted to articles on the practical operation and principles involved in the operation of all kinds of mines and metallurgical plants.

The questions and answers are mainly those that have already appeared in the *Colliery Engineer* and *Metal Miner*, or in *Mines and Minerals*; the answers as originally given have been edited and rearranged so that there may be as little duplication as possible. Certain questions have been added from a file of unpublished examination questions. It is thought, therefore, that this compilation faithfully and fully represents the range of subjects covered at the present time by examinations for certificated mining positions in the United States and some of the provinces of Canada.

This book is intended mainly to assist those preparing themselves for examinations for certificated positions; not as a textbook, but merely as an aid in connection with textbooks on mining. In it none of the general principles or theories of mining are given other than those asked for by specific questions.

The matter contained in the book is divided into 28 chapters, and a table of contents shows the subdivisions under the various heads. In addition, an index of 16 pages greatly facilitates reference.

SYNOPSIS

A. K. C. Yip, *Department of Mathematics, University of Hong Kong, Pokfulam, Hong Kong* (e-mail: yip@maths.hk)

Prince of Wales Island, southeast Alaska.

A. C. Garde has taken his family from Nelson to the Argentine, near an Humber Creek.

L. Alexander is now managing the Emily Edith silver mine in the Silverton district of Colorado.

John B. Hansen, president of the 104,000-member gold miners' Bullion, Omaha, has come to New York.

J. W. Asher, of Asher & Co., 10001 Greenwood, Colorado, U.S.A., examining mining property for English clients.

George H. Aylard of New Denver, manager of the Standard mine in the Slocan district, is visiting in Ohio, U.S.A.

John Appleton was the first to put the use of compressed hydraulic operations on his several placer gold mines in the neighbourhood of Barkerville.

Anthony J. McMillan, managing director of the Le Roi Mining Company, is expected to arrive in Rossland from England during August.

Smith Curtis of Rossland has been looking over copper claims in the neighbourhood of Kamloops. He will probably shortly make Victoria his headquarters instead of Rossland.

Wallace Corbett has been examining the Maggie and Tamarac properties in Ashcroft district, for Butte, Montana, principals.

J. C. Haas has been examining copper claims in the Bella Coola mining division, coast district, for Spokane, Wash., principals.

W. H. Aldridge of Trail, managing director of the Consolidated Mining and Smelting Company of Canada, is in the East and will probably remain there for several weeks.

Chas. L. Tutt, of Denver, Colorado, U.S.A., a well known wealthy mine and smelter owner, has been cruising on the British Columbia coast in his yacht *Anemone*.

Prince of Wales Island, southeast Alaska, which ships its ore to Vancouver Island for treatment.

Henry Croft has returned to Victoria from England where he had been engaged in disposing of the Lenora mine at Mt. Sicker, Vancouver Island.

Hon. Alex. Henderson, the new commissioner for Yukon Territory, arrived at Dawson on July 14. He was cordially received and presented with an address of welcome.

E. E. Andrews, formerly manager of the Pacific Coast Mining Company which worked 6 and 7 below, Bonanza Creek, Yukon, has gone to Arkansas, U.S.A.

Walter G. Perkins remains at Ely, Nevada, U.S.A. His resignation has not been accepted by the Steptoe Valley Smelting and Mining Company.

Lucien Eaton, superintendent of the Iron Belt & Shore Mines, Iron Belt, Wisconsin, U.S.A., was in Victoria with his bride at the end of June.

W. J. Sutton, geologist for the Dunsmuir interests who own coal mines on Vancouver Island, has been looking over coal lands in the Nicola district.

F. C. Laird, manager of the Willow River Mining Company, has returned to Barkerville, Cariboo, from a trip to the East.

R. H. Stewart, manager of the mines of the Consolidated Mining and Smelting Company of Canada, has left Rossland for Ottawa, Ontario, on a month's vacation.

Francis A. Thomson, formerly of Nevada, who some time since was temporarily appointed professor of mining and metallurgy at Washington State College, Pullman, Washington, U.S.A., lately had his appointment made permanent.

after having been to several mining properties in Similkameen district.

Hon. Richard McBride, minister of mines for British Columbia, has returned to the Province from a visit to England. During his absence the provincial secretary, Hon. H. E. Young, was acting minister of mines.

Charles Cammell of the geological branch of the Dominion department of mines, lately spent a few days on the coast, afterwards returning to the Similkameen, in which district he is engaged in geological survey work.

Col. J. H. Conrad has returned to southern Yukon from a business trip to England in connection with the obtaining of capital for some of the Windy Arm mining properties in which he is largely interested.

Fred. T. Congdon, formerly commissioner of Yukon Territory, is in Dawson from Ottawa to attend the exchequer court. He is counsel in several important cases. *En route* to Dawson he visited the Whitehorse copper mines.

F. H. Knight of Grand Forks is manager of the Bertha Consolidated Gold Mining Company, which is developing the Bertha, situated some 12 miles up the north fork of Kettle River from Grand Forks, in the Boundary district.

Milnor Roberts, for several years professor of mining at Washington university, Seattle, Washington, U.S.A., is directing development work at the Moonshine mine in Ketchikan district, southeast Alaska.

P. Davidson Ahier, formerly manager of the Idaho-Alamo silver-lead mines, in the Slovan district, has been appointed manager of the Cariboo-McKinney gold mine at Camp McKinney.

George L. Walker, editor of the *Boston Commercial*, after having spent a week visiting copper mines and smelters in the Boundary district, left Phoenix on July 19 for California and Nevada.

Wm. Fleet Robertson, provincial mineralogist, has been examining Highland Valley claims in the Ashcroft section of Yale district, going thence to Nicola valley, where several coal mines are being opened up.

Robert H. Anderson, for some time superintendent of the Le Roi mine at Rossland, and afterwards manager of the Sullivan Group Company's lead-silver mine in East Kootenay, died recently in Spokane, Washington, U.S.A.

J. E. McAllister of Greenwood, Boundary district, manager of the British Columbia Copper Company, was summoned to Toronto, Ontario, last month, owing to the death there of his father.

John W. Astley of Dawson, Yukon Territory, where he was chief engineer and general manager of the Klondike Mines railway, recently left Dawson for Ottawa, Ontario. Mr. Astley was a pioneer Dominion land surveyor in the Northwest.

Donald G. Forbes, formerly of the Silver Cup mine in the Lardeau district, late in July went from Victoria to the Similkameen district where, as consulting engineer for the Similkameen Mining and Smelting Company, he directs operations on that company's gold-copper mine on Bear Creek.

A. J. Morrison has been given charge of development work on the Moreen mineral claim in Deadwood camp, Boundary district, which was recently visited by Mrs. I. M. Parsons, Minneapolis, Minnesota, U.S.A., secretary of the company prospecting this property.

been examining the Mammoth group, owned by the Edward Baillie Syndicate, Limited, and situated on Goat Mountain, 10 miles from Camborne, Fish River camp.

Geo. W. Hughes recently accompanied two New York capitalists to his zinc mine, the Lucky Jim, in Slocan district.

Robert R. Hedley visited the Vancouver Island Copper Company's Indian Chief group of claims at Sidney Inlet, west coast of Vancouver Island, during the month, and afterwards went north to Atlin.

D. B. Dowling, geologist, has left the Geological Survey of Canada, after 13 years in the service of the Canadian government, and is now in charge of exploration operations of the German Development Company, of Montreal and Ottawa, prospecting for coal near Yellowhead pass through the Rocky Mountains from Alberta to British Columbia.

Rienzi W. MacFarlane who six or seven years ago was directing development work on several mining properties in the Boundary district, going thence to the Malay Peninsula, is in England on a vacation. He is now manager of the Cherokee (Mexican) Prop. Company, at Parral, Chihuahua, Mexico.

Three directors of the Crow's Nest Pass Coal Company—first vice-president Senator Robert Jaffrey, Lieut.-Col. James Mason, and C. C. Dalton—arranged to leave Toronto, Ontario, on July 18 on a visit of inspection of the coal mines and other property of the company in the Crow's Nest Pass district of British Columbia.

R. G. McConnell and F. H. MacLaren of the Dominion department of mines, who are engaged in making a geological survey of Whitehorse copper camp, after having spent five or six weeks in the vicinity of the Grafton and Arctic Chief mines are continuing their work northward near the Copper King.

Col. W. S. Thomas of Bar Harbour, Maine, U.S.A., after having spent several months in the Whitehorse district, Yukon, has gone east to confer with his principals concerning the development of a number of mineral claims in Whitehorse copper camp he has secured for them, either by purchase or under option. He is understood to be the representative of a syndicate of Pennsylvania capitalists.

It is stated that Byron N. White, well known as the head of the company which successfully operated the Slocan Star mine and concentrating mill near Sandon, Slocan district, until so hampered by litigation over extra-lateral rights that further progress was not practicable, intends making Vancouver his headquarters instead of Spokane, Washington. Mr. White is actively developing a copper mine in Whitehorse camp, Yukon Territory.

Thos. Mills, whose resignation as manager of two of the Western Fuel Company's coal mines at Nanaimo was mentioned in last month's MINING RECORD, has entered the service of the Wellington Colliery Company and taken charge of its new workings on Haslam Creek, Vancouver Island. Mr. Mills was lately the recipient of a handsome gift from the Western Fuel Company's employees.

Louis W. Hill, president of the Great Northern Railway, lately visited the Similkameen district. At Hedley he went through the Daly Reduction Company's 40-stamp mill and cyanide plant, and afterwards visited the Yale Mining Company's Nickel Plate mine. He intimated that the completion of the Great Northern railway's road into the district might be expected within a year.

Stanley A. Easton, known to earlier residents in the Boundary district, where he was manager of the Gold Drop mine at Phoenix, is now in charge of the Bunker Hill and Sullivan property in the Coeur d'Alene district of Idaho, U.S.A.

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Some 500 men are employed in the company's mines, which are stated to be tapping out something about 10 per cent. silver per ton and 55 per cent. lead.

From the list of names of those elected as members or associates of the American Institute of Mining Engineers and who during May and June last accepted membership are the following, resident in the Northwest: Lionel H. Cole, Rossland, B.C.; Paul H. Hebb, Tacoma, Washington, U.S.A.; Beach A. Laselle, Barkerville, B.C.; Harold N. Laurie, Perdue, Oregon; Walter F. McNeill, Alberta; B. Leonard Thorne, Hosmer, B.C.; Neville E. Townsend, Rossland, B.C.; Russell G. Wayland, Treadwell, Alaska. The following names are included in the last-published list of candidates for membership: Lyndon K. Armstrong, Spokane, Washington; Glenville Arthur Collins, Seattle, Washington; Carolus D. Emmons, Eugene, Oregon; Wilson Walter Hughes, Ellamar, Alaska; Leon Ewart Savage, Northport, Washington; all in the northwestern part of the United States.

The *Whitehorse Star* says: "W. W. B. McInnes, ex-commissioner of Yukon, now retained by the Guggenheims at a princely salary as their attorney in the Dominion, was in Whitehorse lately on his way to Dawson on professional business." It is stated that Mr. McInnes is representing the Guggenheims at the court Judge Burbidge, of the Canadian federal exchequer court, is holding to deal with the suits brought by the Dominion government to oust the concessionaires from the Bronson and Ray concessions on Bonanza Creek, and the Anderson concession on Hunker Creek, all of which have been declared cancelled. These concessions, covering miles of ground on two of the richest creeks in the Klondike, had remained for years practically unworked, hence the action of the government. The Guggenheim interests are in possession of the Anderson concession and are preparing to install on it a big gold dredge.

OFFICERS OF THE BRITISH COLUMBIA MINE ASSOCIATION

Percy J. Gleazer, of Ymir, to be mining recorder for the Nelson mining division, in place of C. D. Blackwood, resigned.
Constable John A. Fraser, of Ymir, to be a deputy mining recorder for the Nelson mining division, with sub-recording office at Ymir.

Sealed tenders will be received by E. E. Chipman, government agent, Kaslo, up to noon of August 14, proximo, for the purchase of the following named forfeited mineral claims: Arena Fraction, J.I.C., and Jenny Jones.

Certificates of efficiency, authorizing the holders to practise assaying in British Columbia, have been issued by the minister of mines to the following: George William Dunn and George Edwards Cole.

The appointment of Hon. Henry Esson Young as acting minister of mines has been rescinded.

Cory Menhenick, of Camborne, to be acting mining recorder for the Lardeau mining division from July 27, during the absence of Benjamin Ernest Drew.

Archibald Dunbar Taylor, of Vancouver, solicitor, has been appointed the new attorney for the Atlin Mining Company, Limited, in the place of Clarence M. Hamshaw, whose appointment has been revoked.

The State Legislature has appropriated for the Michigan College of Mines, at Houghton, Michigan, U.S.A., \$43,000 for a new central heating and power plant, also \$75,000 for a library and museum building.

According to statistics compiled by Aron Hirsch & Sohn, the great metal-buying firm, of Halberstadt, Germany, the copper production of all countries in 1906 totalled 736,711 metric tons.



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NOTES AND COMMENTS.

Kootenay and Boundary mines have produced more than 1,000,000 tons of ore this year.

Another large body of copper ore has been uncovered on the Oro Denors, in the Boundary district.

The Mount Baker quadrangle, bordering British Columbia, in the Washington forest reserve, is to be mapped by Robert Muldrow of the United States Geological Survey.

Roseland recently received \$2,500 from the provincial treasurer, being a portion of the 2 per cent. tax collected by the province from the output of the mines within the corporate limits.

At the Cariboo-McKinney gold stamp mill, Camp McKinney, ten stamps are in operation, and it is stated that ten more will shortly be in use. Some 30 men are employed at mine and mill.

Saturday, 17th inst., was a busy day in Fernie, says the *Fernie Free Press*. The miners having nearly all recovered from the strike, are spending their money freely and business generally is good.

The output of ore from the Dominion Copper Company's Sunset mine, near Greenwood, has been increased to 1,500 or 1,600 tons per week. Its aggregate production to date is rather more than 100,000 tons.

The result of the competition for prizes offered by A. C. Flumerfelt of Victoria for essays on several named subjects has been announced. That for an Mining was awarded to Mrs. Young, of Victoria, wife of Dr. Young, provincial secretary.

From a preliminary statement of the production of lead in the United States in 1906, prepared by the U. S. Geological Survey, it is learned that included in the total were 7,238 tons produced from British Columbia ores.

Active development work will shortly be commenced by the British Columbia Copper Company

on the Minnie Moore claim, which adjoins the Emma and Jumbo claims in Summit camp, Boundary district. There are surface indications that the lode being developed on the Emma extends into the Minnie Moore.

G. W. Hughes, of the Lucky Jim mine, states that ore is being shipped from that property as fast as ore cars are provided at Troup Junction, says the *Nelson Canadian*. Pending the decision of the courts on the American mine owners' appeal from the ruling of the customs appraiser, the duty is being paid under protest.

A press despatch from Moyie, East Kootenay, states that: On account of a large accumulation of lead ores at the smelter at Trail, the Consolidated Mining and Smelting Company of Canada, Limited, have completed a contract with European buyers for a considerable tonnage of the concentrates from the St. Eugene mine to be shipped abroad.

A recent arrival at Whitehorse, southern Yukon, informed the *Weekly Star* of that town that the Livingstone Syndicate, operating on Livingstone Creek in that district, is recovering gold to the value of \$8,000 every day it carries on work. Several individual miners are also doing well. It is claimed that for the number of men employed as much gold is being produced on this creek as on any other in the Yukon.

Two United States Geological Survey parties are in Alaska making detailed maps of, respectively, Kasaan Peninsula of Prince of Wales Island and the Fairbanks country. Later the region lying between the International Boundary west of Dawson, Yukon Territory, and Fairbanks, adjoining the southern boundary of an area already mapped, will be surveyed for mapping on the scale of one-half inch to the mile.

From the *Frank Paper* it is learned that General Manager S. M. Moore of the Canadian-American Coal and Coke Company of Frank, southwest Alberta, who went to Montana lately in search of miners, has returned. He states that Montana is far worse off for men than this country and that every sort of industry is hampered for want of help. Mr. Moore succeeded in securing quite a number of good miners from among men who had worked for him in Montana.

A press despatch from Dawson states that on August 18 the Yukon council appointed a committee to memorialize the federal government of Canada regarding the Boyle concession in the Klondike camp. It covers 40 sq. miles, and is partly owned by the Guggenheims. The memorial will ask an investigation by the government as to how the concession was acquired and how held. One member of the council

denounced this concession as a great steal of a large portion of the richest Klondike placers.

Owing to complaints against the system long in force of paying by cheques on pay-day instead of in cash the Crow's Nest Pass Coal Company some time since arranged with one of the banks to cash the cheques at the company's offices at time of payment to the men. A similar course is now followed at the Consolidated Mining and Smelting Company's St. Eugene mine at Moyie, East Kootenay. On the pay-day in August the Imperial Bank of Canada sent officials and money to Moyie. More than 400 men were paid, their cheques totalling \$38,500, and cash was obtainable at the company's offices.

In an editorial headed "Larger Smelting Capacity Wanted," the *Rossland Miner* stated that "the plant of the B. C. Copper Company can put through about 1,200 tons a day." Seeing that with only two of its three big furnaces in blast, 9,471 tons of ore were smelted in one week in August, while during the next following week the total was 8,875 tons with two furnaces running about six full days—practically 740 tons per furnace per diem—it is evident the capacity of the Greenwood smelter is nearer 2,200 tons a day. Perhaps the *Miner* will make a note of this correction.

The *Canadian Manufacturer*, published in Toronto, Ontario, has informed its readers that "the Boundary mines, B.C., are turning out copper at the rate of 4,500,000 lb. daily." That this is a ridiculous mistake is manifest when it is remembered that in 1906 the whole of British Columbia produced rather under 43,000,000 lb. of copper. The total production of the United States last year was less than 2,500,000 lb. per day. British Columbia will have to largely develop its copper producing industry before it will reach a production of 250,000 lb. per day, not to say 4,500,000 lb.

Contractors for the construction of the extension of the Crow's Nest Southern railway, from Fernie to Michel, are advertising for 500 men for this work, so it would appear that the Great Northern, which is stated to own the Crow's Nest Southern charter, will within a few months be in a position to haul coal and coke from Michel as well as from Fernie. When this railway shall have a line to the collieries in the eastern foothills of the Rocky Mountains as well as to those on the western slope, it is probable its competition with the Canadian Pacific will result in there being less cause for complaints of a shortage of cars for transporting fuel to mines and smelters.

Advices from Yukon Territory are to the effect that the water in Yukon River was lower in the latter part of August than when navigation was closed last year a month later, and lower than had previously been known at this time for years. As a conse-

quence the transportation of freight is being much hampered, steamers and freight barges getting on sand bars. The number of people leaving for "the outside" is already large, chiefly from Dawson and lower Yukon points and especially from Fairbanks. Alaska, this heavy outgoing travel being fully a month earlier than last year. It is estimated that there will be fewer people by about one-half remain in the country through the coming winter than in any year since 1898.

The report of the Alberta coal commission has been placed in the hands of Hon. Mr. Cushing, minister of public works. The commission has made no recommendation referring to an eight-hour day law. Omission of a recommendation on this point is in a measure due to the fact that the provincial government has already promised this legislation. The report covers completely every point brought out in the evidence at various sittings of the commission in the different mining centres of the province. The report is concise and each point is dealt with in order. The recommendations made are drafted as follows: Closer inspection of ventilation of smaller mines, erection of bathhouses at mines to be compulsory. Minimum age of boys employed in mines to be sixteen years.

On August 31 the *Colonist*, Victoria, published the following: The *Mining Journal* of London, England, which is the leading British journal of its class, and now in its 73rd year of publication, in its issue of August 10, received yesterday, reviews at considerable length the annual report of the minister of mines for British Columbia for 1906. Its editorial comments are generally favourable and indicate that there is now more interest taken in British Columbia mining matters than for several years past. In the same issue also appears a full page illustrated article on "Placer Mining in British Columbia," contributed by the *Mining Journal's* special correspondent in this province (E. Jacobs, editor of the *BRITISH COLUMBIA MINING RECORD*). This article comprehensively reviews the placer gold mining industry in British Columbia and gives reliable information relative to its condition in the chief placer mining sections of the province.

The output of ore from the mines of the Kootenay and Boundary districts for eight months to August 31 is shown by published tonnage returns to have been approximately 1,055,000 tons. Boundary copper mines have produced about 785,000 tons and Kootenay mines the remaining 270,000 tons. Included in the latter is the production of Rossland mines—about 180,000 tons. By far the greater part of the production was copper-gold ore. Boundary smelters treated nearly 800,000 tons (including a few thousand tons from mines in the northern part of the State of Washington); the Trail smelter 155,000 tons, part silver-lead, but mostly copper

ore. Nelson 12,000 tons and Marysville 74,000 tons both shipped up and concentrated, and the La Roi Mining Company's works at Northport, Washington, 34,000 tons (last) from the company's mines at Rossland.

Another air compressor has been ordered from the Canadian Rand Company, Limited, for the British Columbia Copper Company's Mother Lode mine, near Boundary district—a duplex tandem compound Rand-Corliss engine complete with sole plate extending over the whole of the foundation. The two high pressure cylinders are 18 in. diameter by 36 in. stroke; the two low pressure 36 in. diameter by 36 in. stroke. Capacity of compressor, which is fitted with latest type of regulator maintaining constant pressure and variable volume, is 3,400 cu. ft. of free air per min., equal to operating about 30 machine drills. The engine, the rope wheel of which is 18 ft. diameter with face grooved for 18 1½-in. ropes, will be driven by a 650-h.p. Canadian General Electric induction motor. Delivery at mine is promised by about November 1 and it is planned to have this new plant running early in January and to thereby double present power drill capacity at the Mother Lode mine.

W. W. B. McInnes, ex-commissioner of the Yukon, has been reported to have informed a Vancouver newspaper representative that there is much capital being expended in that country. The Guggenheims are employing more than 1,700 men and other companies are doing work in preparation for extensive operations next summer. The present season has been the driest known in the North, consequently hydraulic mining has been much restricted on Yukon creeks. The chief gold mining operations have been dredging. Seven dredges have been at work and five more are being put together to be in readiness for next season. The gold output for this year is estimated at only about \$3,000,000, the lowest production for any year since the Canadian Yukon became a large producer. The magnitude of the works in hand for bringing in a supply of water for future hydraulicking operations—the Guggenheims water supply system alone having about 70 miles of ditches, flumes and piping—indicates that hereafter there will be an abundance of water even in dry years, with a resultant considerably increased yield of gold.

Yon August 3 the *Miner and Smelter Press* of San Francisco, California, published a letter from New York which opened by stating that "the Guggenheims have been the subject of many rumors lately, and all of them suggest financial embarrassment." In connection with the talk it is stated that "the late Mr. J. P. Morgan has been associated with Mr. Daniel Guggenheim and his brothers, the following excerpt will probably interest many in the Northwest: "The transfer of a ten million

dollar interest in the smelter trust is likely to be a part of a Morgan participation with Guggenheim in Alaska. It will be remembered that the Morgan and Guggenheim interests have worked together over the Copper River railroad and copper mines. In their railroad scheme they have fought the White Pass people in a contest over right of way. More important even than the copper mines is the coalfield at the foot of Mt. St. Elias, to exploit which a strong consolidation has been formed this week. A semi-anthracite coal has been found in quantity sufficient to make it a factor in the development of the Pacific coast; any mineral development that will break the high prices now paid in San Francisco is likely to be welcomed."

The arbitration committee provided for in the new agreement between the operators and the U.M.W.A. for this district, met at Banff during August. The committee is a permanent one and is composed of three operators and three union representatives. Its purpose is to consider all differences that may arise through different interpretations that may be put upon the various clauses of the agreement. The Western Coal Operators' Association was represented by Lewis Stockett, W. F. McNeill and —. Williams, and the United Mine Workers of America by three officers of local District 18, viz., F. H. Sherman, president; John R. Galvin, vice-president; and J. A. McDonald, secretary. Mr. Galvin afterwards stated for publication that at the meeting "there was more harmony between the representatives of the mine workers and the operators than ever before. Each side is getting on a basis of understanding the other better. The men themselves understand both their contracts and the operators better. The operators also have come to understand the men better since last winter." Mr. Galvin further expressed the opinion that in Alberta there will be enough coal mined next winter to provide for commercial and industrial purposes but not for domestic use. He thinks an increase in production of about 3,000 tons of coal daily will be required to meet the winter's demands, but up to the present the daily increase is small. A report from another source stated that all unsettled questions were decided amicably, including that of the back-hand system which recently caused friction at the Lille colliery. It was decided to continue the system.

The *International-American* of Douglas, Arizona, on July 29 published the following despatch from Mexico City: "The supreme court this morning decided the final writ of amparo in the El Tigre litigation in favour of the El Tigre Mining Company by an unanimous vote of the thirteen judges. The decision reverses the Cananea judge on all points. The supreme court declares in its decision that payment was made by the El Tigre Mining Company in full compliance with its contract and that the acts of Graham and the Ensenada crowd were wholly

impertinent, illegal and without justification." The *International-American* added: "The decision just rendered by the supreme court of Mexico in favour of the Tigre Mining Company recalls one of the most sensational and bold attempts to take a mining property from those in possession who were its owners that has ever been recorded in the southwest, and the litigation which ensued for two years since the notorious midnight raid of July 6, 1905, by B. F. Graham, when accompanied by a body of armed men, he seized the Tigre mines in the state of Sonora, has been probably the most famous and fiercely contested that has ever occurred in the courts of Mexico. This litigation in its various stages, both civil and criminal, has occupied the attention of the highest federal and state courts of Sonora and has been before the supreme court of the republic of Mexico no less than five times, this last decision just rendered by this court being upon the merits on all points of appeal from the final decision of the federal district court of Sonora in favour of the Tigre Mining Company." The *MINING RECORD* has been informed that the B. F. Graham, above stated to have seized the Tigre mines, is now operating on the Pacific coast of British Columbia.

The walking gasometer known as "Chippy" Hill appears to have been amusing himself in characteristic fashion with some of the newspaper men during a recent visit to the coast cities. One modest assertion, which afterwards found its way into eastern newspapers was as follows: "The construction of a large blast furnace for the manufacture of iron and steel will be commenced shortly near Kootenay Landing, B.C., . . . Within two years we will be supplying steel rails to all points on the continent west of the Rockies as well as to the Orient. I have been authorized by members of the company to lay out comprehensive plans of development, including an expenditure during the next year and a half of \$2,500,000. Plans are being drawn up by a Pittsburg engineer. . . . The ore will be handled to the C.P.R. line at a rate of three thousand tons per day." Of course it is immaterial that Sir Thomas Shoughnessy and his associates, who some time ago were beguiled into paying a lot of money for iron claims they are not likely to obtain any return from for years, if at all, will probably deny all knowledge of the alleged intention to launch the big enterprise the gassy "Chippy" is reported to have talked about in such impressive language. By the way, it is a pity he did not tell the newspaper men about the "divvy up" at the time of the sale of those iron claims, for this has for years been regarded in the Kootenay as a striking instance of a successful endeavour to serve two masters at one and the same time. Then there was all the talk of the big new electric fan at the Hilcrest coal mine and the transformation which "if it is installed and working" would enable the immediate commencement of production of coal at the rate of 600 tons

a day. It is too bad that the *Frank Page*, published near the Hlhorst mine, should print this bubble by printing this comment: "All of which makes interesting reading in this part of the country. Must be they didn't get the fun started." Truly, it is a hard world we live in, my masters, when doubt is thrown on such interesting fairy tales.

The *Rosland Miner* a short time ago said editorially: "The mining industry of the Province has reached a stage when it can get along, if needs be, without outside capital. It is strong, it is sturdy and is self-supporting." This, in our opinion, is an empty boast and the reason we refer to it here is because it is understood the *Miner* has among its wide circle of readers many who take more than passing interest in mining in British Columbia. We should be glad to feel justified in joining the *Miner* in so optimistic a view of the situation in connection with mining in this Province, but since a close examination of the published official statistics for 1906 does not show much real progress to have been made as compared with 1905, we are reluctantly compelled to come to a different conclusion. We know it has been stated freely that a considerable advance was made last year, but unfortunately such was not the case, in regard to quantity produced, in any of the metalliferous minerals produced in British Columbia except copper, which alone showed a substantial increase in quantity as well as in market value, and even that metal owed about 65 per cent. of its increased total value to the higher average price for the year as compared with that for 1905. Nor was there an important increase in the production of coal and coke, the combined value of which was only \$36,183 larger than that for 1905. There have been so many disturbing influences affecting the current year's production that it will not be surprising to find the year's total value little, if any, higher than that of last year. Copper may again save the situation, for the average market value for eight months to the end of August has been nearly four cents higher than that of last year. Coal, too, may possibly show an increase, for the Vancouver Island collieries have been steadily producing with little interruption the year through to date, so may in part offset the reduced production of Crow's Nest Pass collieries. On the whole, though, the probabilities are, in our opinion, not much in favour of any considerable increase in total value of production. What is most required is, we think, a large accession of capital for thoroughly developing new properties, so that instead of having only a comparatively few producing on an appreciably large scale there may be many. An increase in total value which is dependent chiefly on high prices for metals is not the most desirable basis for an industry to rest upon; a greatly enlarged production, on the other hand, would tend to ensure prosperity that would not be precarious, and it is in this direction we would welcome steadily increasing expansion.

THE SHORTAGE OF COKE AT INTERIOR SMELTERS.

A SHORTAGE OF COKE at the Interior smelters in the Boundary and Kootenay districts has occasioned much severe criticism directed chiefly against the Crow's Nest Pass Coal Company, to which most of the smelters look for their coke supply. Advantage has been taken of the situation to endeavour to make it appear that much coke has been sent to the United States which, had it been supplied to British Columbia smelters, would have prevented the trouble that appears to have arisen. It was a poor attempt at deception, though, for it was speedily shown that of some 27,000 tons of coke stated to have been shipped to the United States this year, more than half—about 15,000 tons—went to Northport, where is situated the Le Roi Company's smelter treating little else than Rosland ores. This fact, was at first carefully withheld when the associated press despatches were sent out, and the public was left to infer that the coke was all being sent to Montana. Then it gradually dawned upon non-partisans that there were other influences at work than simply the interests of most of the British Columbia smelters, and there were not wanting those who asserted that behind the agitation was a renewal of two old fights, viz., that to prevent the Le Roi Company smelting the ore from its mines at Rosland at its own smelting works, which happen to be located a few miles south of the International Boundary line, and the other the clashing of interests of rival railways—the Canadian Pacific and Great Northern systems, respectively.

As the Provincial Government sent the deputy minister of mines to the several smelters and collieries directly concerned, for the purpose of obtaining information for a full report on the actual facts of the case, it is not likely that any good purpose would be served by repeating here the various statements pro and con that have already been published. In addition to the report of the deputy minister of mines, the Government has had the representations personally made by Mr. A. J. McMillan, representing the Le Roi Mining Company and the necessity for the coke requirements of its smelting works being provided for in any action the Government may take in the matter. Of Mr. J. H. S. Smith, member for Ymir district and the representative of the Canadian Pacific Railway and Consolidated Mining and Smelting companies, who are known to have been active in the recent agitation; and communications from the several district boards of trade, labour unions, etc., which passed resolutions requesting the Provincial Government to do things "unreasonable and otherwise this season."

No doubt the position has been complicated by the transportation delays which have at times resulted from a shortage of cars, and in the undeniable difficulty in obtaining sufficient labour to allow of the collieries being worked to their full capacity. These

and other factors in the situation will, doubtless, be fully considered by the Government ere it decides upon its course of action. Meanwhile, both railways and fuel companies seem to be doing what they can to overcome the difficulty, and it is probable that one result of the agitation will be an improvement in conditions all around, and that if there have existed reasonable grounds for complaint these will be removed, to the relief and advantage of the mining and smelting industries concerned.

REFINING METALS IN CANADA.

IGNORANCE of the great progress made in British Columbia in connection with the mining and metallurgical industries is occasionally manifested by the incorrect statements of writers for publication. Even those who write to the technical mining journals at times blunder in this connection. Some of these erroneous statements were recently challenged, as shown in the following extract from the *Engineering and Mining Journal* of New York:

"In the *Journal* of August 17, in the Toronto special correspondent's letter, the following occurs: 'Owing to there being no smelters in Canada capable of purifying ore sufficiently for coinage purposes, the new Canadian mint will have to look to the United States for refined metal. . . . It is stated that 1,000,000 oz. of silver will be wanted at the mint in November. The ore will have to be shipped across the border for treatment and brought back as refined metal.'

"These statements are entirely erroneous. A press despatch from the East similarly in error, was recently published in daily newspapers in British Columbia. In Victoria the daily *Colonist* promptly published a correction, communicated by myself, to the following effect: The Consolidated Mining and Smelting Company of Canada owns a lead and silver refinery, as well as a copper and lead smelter, situated at Trail, British Columbia. I was shown through these works in the fall of 1904, and was then informed that the refining of silver and gold there, as well as of lead, the last metal by the electrolytic process, had been in successful operation for some time.

"The Betts Process at Trail, B.C.' was the subject of a thesis submitted by A. G. Wolf, to the Colorado State School of Mines. This was read before the April, 1907, meeting of the Western Association of Technical Chemists and Metallurgists, Denver, Colo., and has since been published in several technical journals. From this it is learned that the lead refinery was erected in 1902. It has since been enlarged from time to time, until now lead, gold, silver and copper sulphate are its refined products. The silver and gold by-products from the refining of lead are produced to the extent of, approximately, 150,000 oz. silver and 2,000 oz. gold per month, or 1,800,000 oz. silver and 24,000 oz. gold per year.

I have the assurance of the manager of the works that the silver produced is always better than 998 fine, and that the greater portion goes as high as 999 fine, which he claims to be equal to any refined silver on the market. The Trail silver product is sold to the United States for coinage purposes, also to the Chinese and Japanese governments.

"May I add in conclusion, that Dr. A. P. Low, deputy minister of mines for Canada, who is in Victoria today, in the course of a newspaper interview yesterday, said: 'The talk about the inability of the government to get silver at home for the new mint at Ottawa is all nonsense. A supply is available from Trail, B.C., where a refinery is in successful operation.'

"E. JACOBS,

"Editor B. C. MINING RECORD.

"Victoria, B.C., August 27, 1907."

(The statement referred to is undoubtedly incorrect. Its publication in the *Journal* was due to an oversight, such as will occasionally happen in an editorial room in a period of unusually strenuous work. References have been made in the *Journal* several times to the works at Trail and their production of metals.—Editor *Engineering and Mining Journal*.)

A *Reuter* despatch to London advises that the total of dividends from Transvaal mines for the first half of 1907 is £3,127,983.

At the general convention of the Western Federation of Miners held lately at Denver, Colorado, U.S.A., a vote in favour of socialism was carried by 283 to 66. This in effect pledged the members to a socialistic platform. Messrs. Moyer and Haywood were re-elected to office.

The copper situation was discussed by Messrs. D. Houston & Company of New York in their *Copper Circular* of August 1. Their concluding comments were as follows: "There is no reason to expect any permanent set-back in the use of copper, and the future will undoubtedly see all past records in the way of demand greatly eclipsed. The civilization of this age and the possibilities opening up for further electrical expansion make the prospect for copper an exceedingly bright one. If it were possible to guarantee a United States production of a billion pounds of copper annually for five consecutive years at a market price not over 20 cents per pound, then we might expect to see an adjustment of electrical and industrial interests on a basis that would warrant some of the mightiest undertakings ever achieved. Enough metal for an expanding demand is a more important consideration to the world of progress than slight price fluctuations. The promoters of great movements and the builders of great systems want to be sure that the material they need to carry out their projects will be forthcoming in sufficient quantities."

THE LE ROI NO. 2, LIMITED.

L E ROI NO. 2 MINE at Roseland shows considerable improvement as the result of recent developments. The directors of the company have issued a circular stating that in view of the many enquiries from shareholders, opportunity was taken to in this way give information as to the position of the affairs of the company generally, as follows:

Shipments from the Josie mine at Roseland have, during the past six months been seriously restricted by causes which have been entirely outside of control, and, in fact, have equally affected all mining interests in British Columbia. These causes briefly have been:—Firstly, the shutting down of the smelters owing to the coal strike and the consequent inability of the mine to ship during that period. Secondly, the abnormal severity of the winter, owing to which the railway yards were blocked, and consequently the supply of cars became very limited; and, thirdly, the scarcity of labour.

Against these adverse circumstances there has, on the other hand, been a very marked improvement in the position of the mine itself—so much so that it may safely be asserted that the mine has now attained larger dimensions than have hitherto been anticipated. This has been achieved as the result of a considerable cost in development, but that additional cost has been more than justified by results.

The II. vein, which has hitherto only been known to exist for a length of some 1,200 ft. on the 500-ft. level, has now been located on both the 700 and 900-ft. levels. On the 700-ft. level the assays, as far as the work has extended, are, on the whole, equal in value to those on the 500-ft. level, and it is to be hoped that with further development the 900-ft. level will come up to the same standard. At present, however, very little work has been done there, the policy of the management being to devote its attention primarily to the fresh developments on the 700-ft. level.

The full significance of these new discoveries will be better appreciated when it is understood that the II. vein on the 500-ft. level is of unusually high grade, and that all the ore so far extracted from it has been above that level, the floor of which remains intact. In addition to these new discoveries an important orebody has been located by diamond drill at a depth of about 1,200 ft., thereby entirely dispelling the theory which has hitherto existed that it will be necessary to pass through a large barren zone before recovering the orebodies in depth. Latest advices from the manager also announce a strike of ore containing high copper values on the 400-ft. level.

From this brief summary it will be seen that shareholders can look forward with confidence to an extended period of prosperity as regards the Josie mine.

One of the Le Roi No. 2 pages the company has at present sent the Vancouver group of silver-lead mines situated in the Skeena district. This property is being actively developed under the direction of Messrs. Hill and Stewart, the company's consulting engineers. It was within the last month been visited by one of the directors, and his information, backed up by that of Messrs. Hill and Stewart, is that the mine has reached the prospecting stage, and is unquestionably deserving of a prospect of great value. The policy of the board is to develop the mine sufficiently to warrant the flotation of a new company.

The Cloncurry Syndicate has an issued capital of 46,650 £1 shares, of which the company holds roughly one-third. The directors are informed that the position of that syndicate is highly satisfactory, owning as it does, about one-third of the Queensland Exploration Company's capital (£200,000) and having in addition cash in hand representing more than £1 per share.

WORK OF GEOLOGICAL SURVEY IN THE WEST.

M R. A. P. LOW, deputy minister of mines and director of the Geological Survey, was recently on the Coast on his annual tour of the West. He was enthusiastic about the mineral resources of British Columbia, said the *News-Advertiser*, and had no hesitation in saying that it is easily the most richly mineralized province in the Dominion. He predicted that the expansion of its mineral industry in the near future will be such that within the next ten years the Pacific coast will be the home of a well-established iron and steel industry.

Mr. Low stated that his department had thirty parties in the field, several being in Yukon and British Columbia, examining new mining districts and preparing maps of the structural geology. He hopes that in a short time such progress will have been made with the work that maps will be available for every prospector and capitalist. A section of the mainland north of Howe Sound and Texada Island, and a part of Vancouver Island are being examined for this purpose. Surveys are also being made in different parts for iron deposits and copper, coal and silver-lead areas.

On his way West, Mr. Low inspected the work of boring for gas on the Sarcee Reserve near Calgary. The well had reached a depth of 2,100 ft. Among Mr. Low's interesting statements is one that Mr. Jos. Keele, of his department, is making an ascent of the Pelly River, Yukon, and will winter at its headwaters. In the spring he is to cross the divide and descend a branch of the Mackenzie on the Arctic slope. He is to keep a sharp look-out for the alleged volcano in that district. Mr. Low thinks it will prove on examination to be nothing more than a seam of burning coal.

MINING IN NORTH KOOTENAY.

From a Correspondent.

IN NORTHERN KOOTENAY the mining outlook is now better than it has been for some years past. There is active enquiry for mining properties.

The Standard Mine in the Big Bend district, owned by the Prince Mining and Development Company, of Revelstoke, has been bonded to eastern men for \$150,000 and if the deal should go through this should return shareholders 15 cents per share and leave them still owners of half the number of claims the company now holds. A lot of development work has been done on this property. A lense of ore has been developed to a depth of 525 ft., and there have been done about 1,400 ft. of tunneling, 400 ft. of drifting, and 450 ft. of winzes and raises, beside several open cuts. The ore is copper-bearing.

Mr. Vance, representing Mr. Hoover, an Indiana mining man, is getting the French Creek hydraulic mine into shape for working again and has also located the ground on Goldstream, at the mouth of French Creek, with a view to operating an elevator system there. Prospect shafts sunk there in years gone by showed good ground but the difficulty in working it has been found to be the quantity of water.

The Revelstoke and McCullough Creek Hydraulic Company is working this season, but has had some delay owing to a slide, which carried away parts of the flume and pipe line.

Pittsburg investors are putting in an hydraulic plant on Smith Creek.

At Camborne the Imperial Development Company has its compressor at work and is pushing development, the mill being run to crush the ore taken out. A Wilfey table is to be added to the mill plant to treat the coarser concentrates, thus relieving the Frue vanners of much of the material.

Eastern men have bonded the Oyster-Criterion, the property of the Northern Mines Company, which suspended active operations more than two years ago on account of the trouble this company had over its Poplar Camp holdings. There is a 10-stamp mill, air compressor, and aerial tram at the property. E. A. Haggen, mining engineer of Revelstoke, has been instructed to examine the mine and plant for the proposed purchasers.

The Edward Baillie Syndicate proposes equipping its Mammoth mine, on Goat Mountain near Camborne, with an aerial tramway.

W. J. Butler, who owns the Lucky Jack, adjoining the Oyster-Criterion, is putting in a 2-stamp mill.

The Beatrice Company proposes installing a tramway system to enable it to ship out ore.

The Elwood Tin Workers Gold Mining Company intends to start up its mill this month at the Silver Dollar.

The Ohio Mines Development Company is pushing work at the Broadview mine in Ferguson Camp. Its No. 3 tunnel is now in 800 ft., and a raise will be made from this to the shaft which has been sunk 120 ft. No. 4 level is also being pushed, as the working level. The orebody is large and appears to be mineralized for more than 20 ft. of its width.

The same company has had the St. Elmo, Blue Bell, and True Fissure, examined and has taken an option on these properties, on which there is an immense surface showing, the hanging wall of the orebody having been eroded off over an area of between three and four acres. The surface shows from 6 in. to 3 ft. of solid galena, which will average \$30 per ton in silver and lead values. Two cross veins are to be seen and at the intersection of the two systems there are streaks of rich ore, which, however, have not been developed. Considerable work has been done on the Blue Bell and True Fissure claims. The vein where cross-cut is 57 ft. in width and carries pay ore for a width of 12 ft. It is intended to install a 500-ton mill to treat the ore from these properties.

The Silver Cup, the old and tried producer of the district, is shipping from development two carloads a month of ore which nets \$150 per ton. A hoisting plant has been installed and a shaft sunk for 100 ft. below the 700-ft. level. A 30-drill compressor is also being put in. The mine is doing well under Mr. Merry's management.

The Cromwell, Fidelity, and Copper Chief properties at Trout Lake have been bonded by eastern parties.

E. A. Haggen has taken up for New York men the Calumet and Hecla Group on Rapid Creek. The vein is 25 ft. wide, and gold can be panned all over its face where exposed. Rich specimens have found on this property and were among those responsible for the Poplar Creek excitement about four years ago. The new operators are extending the cross-cut tunnel, which was formerly run with a view to cross-cutting the vein under the shaft, and then raising. Should this work result satisfactorily a low-level tunnel will be run from a point close to the railway track above the bed of the Lardeau River. The work being done will indicate whether the veins here are likely to average up payable values, and in view of the past history of Poplar as a specimen camp the outcome will be awaited with interest.

A press despatch from Seattle, Washington, U. S. A., states that: "In a new contract between the United Mine Workers of America and the coal operators the former secured many important concessions. The union is recognized, and the miners have been given an eight-hour day. The increase in wages, to go into effect at once, will average 15 per cent. The miners are also given control of hospital dues and the right to engage their own physicians."

THE ATLIN MINING DIVISION OF
CASSIAR DISTRICT.

Report of J. A. Fraser, Gold Commissioner.

ATLIN'S GOLD PRODUCTION for the nine seasons its gold placers have been worked has reached an aggregate value of \$3,925,000. Its smallest output during that period was in its first season (1898) when a total recovery of \$75,000 was recorded, and its largest in 1899, with a total of

about as many men engaged in working during the thirteenth season of 1906 as in 1905, viz., about 150, and though the individual operators were fewer, the results, generally speaking, were as good as in previous years. There is, apparently, a falling off in production and amount of royalty obtained, as compared with 1905, but this is more than accounted for by the decreased output from Boulder Creek alone, which is explained elsewhere. If the output of that creek is deducted from each season's returns there will be an increase shown for the remainder of this



An old View of Atlin Lake and Mountains opposite Atlin.

\$800,000. For 1906 the official record shows an output of \$455,000 as compared with \$175,000 for 1905. There appears to be good reason, though, to look for an increased production in 1907.

The last official report of the gold commissioner for the division taken from the "Annual Report of the Minister of Mines for 1906," follows:—

This division now includes what were formerly the Chilkat, Bennett and Teslin mining divisions, and covers the north-west portion of the Province from the height of land between the Teslin and Stikine Rivers on the south and east to the Yukon and Alaskan boundaries on the north and west. There were

district of about 1,000 oz. in favour of 1906.

The scarcity of water was again an embarrassment, and will doubtless continue to be so until reservoirs are established on the various creeks and sources of supply.

The drifting operations of last winter were, on the whole, very satisfactory, but there are fewer men operating in that way this winter than for several years; not more than 100 as against 190 last winter and 250 the winter before. This is due to several causes, principally that the sections along the creeks where the best results have been obtained in the past have been pretty well worked out, and,

while the "pay" is not by any means exhausted, the operators realize the necessity for better plant and facilities for operation, the installation of which would involve an expenditure they, individually, are unable to undertake. Consequently the properties are being gradually acquired by companies, who are not disposed to prosecute winter operations to any extent. There is no reason for supposing that portions of Spruce and other creeks which remain practically untouched will not prove just as rich as the parts already tested when systematically operated.

Drifting operations are being carried on this win-

(Note by Provincial Mineralogist.—The following particulars of the season's work have been received from F. T. Hamshaw, president and manager of the company, since the gold commissioner's report was written:—

"The entire season of 1906 was put in hydraulicking into the bench at right angles with the creek. This is believed to be the break from the old channel on the hill, and it is our intention to follow up this break about 500 ft. farther; this should bring us into this supposed old channel. The deep ground runs into the hill and there is heavy gold found on



Discovery Claim on Pine Creek, Atlin, in the Summer of 1899.

ter on Spruce, Pine, Gold Run, Boulder and Gold Bottom Creeks.

MCKEE CREEK.

Only four individual miners operated on this creek during the season. Of the companies, the McKee Consolidated Hydraulic, Ltd., under the management of William H. Davis, spent the season between May 1 and August 17 prospecting for an older and deeper channel, supposed to exist to the south of, and parallel with, the present channel. The banks are high, about 110 ft., and the material very hard, yet, with an average of 10 men, they moved about 100,000 cu. yd. of material and uncovered about 2,000 sq. yd. of bedrock, without, however, securing sufficient gold to cover expenses. The mine was closed down on August 17 on account of scarcity of water, but not until they had uncovered what they consider very promising indications of the existence of the channel sought, farther south than they were able to reach this year.

this right limit; in fact, we have taken out, during all our development work, about \$6,000. From this break the amount we recovered this year was 163 oz., and as Ginaca (who had the use of our hydraulic during the season of 1905) recovered practically nothing from that portion of the present creek bed above this break, we are now more convinced that the original run of gold is on a higher level and that this break is the feeder at this point. It will probably require one season to finish this development work and it may be a drill will be used next spring to prove the existence of this channel."

The Amalgamated McKee Creek Mining Company, Ltd., under the management of S. H. Plumbe, operated farther down stream. The banks are high (140 ft.); the material is hard and cemented, with large boulders, so powder drifts were run in and dynamite used to shake it up. Water under pressure was applied on May 12, and for about 10 weeks two 6-in. monitors were used. Water began to fail dur-

ing the first week in August, and on September 22 the mine was closed down for lack of enough to continue hydraulicking. They were also hampered by the "tailings" and debris from the upper company's operations, which necessitated the construction of a debris dam across the creek. Other necessary dead-work done during the season was the building of about 1,200 ft. of flume. Notwithstanding these difficulties and the shortage of water, with an average force of 18 men, they uncovered nearly 8,000 sq. yd. of bedrock, yielding upwards of \$4 per sq. yd., and netting a handsome profit on the season's operations. This company intends installing a steam shovel plant for next season's operations.

(Note by Provincial Mineralogist.—F. T. Hamshaw, president and manager of this company also,

so far only one rim has been encountered; but we are now convinced that we have an immense body of gravel that will average about 30 cents per sq. ft. of bedrock.

"The Christopher flume will be completed next summer. This will give us 110 ft. more pressure head and we will use this pipe line for removing the top material down to within 12 ft. of bedrock.

"It is the intention of the company to put a heavy steam shovel plant on this property next year that will be worked with the hydraulics. There is two years' work on the left limit of the creek that has no over-burden to remove before beginning work on the lower strata which will be worked by the hydraulic. The stripping of our top material occupies but little time, for we can usually remove enough of the upper



Hydraulic Mining on Pine Creek, Atlin, in 1906.

has, since the foregoing report was written, forwarded to the gold commissioner the following notes on its season's work:—

"During our operations on McKee Creek for the year 1906, by the Amalgamated McKee Creek Mining Company, Ltd., we have taken out \$32,000. We found the values increasing as we went farther into the bench. For the past three years that portion which lies nearest the right rim has been by far the richest, and the past two years have proved that the bedrock averages about \$12 per sq. yd., while in the middle of the creek it ran as low as \$3. We had a fairly good season of water but our low pressure pipe line was not sufficient to handle the heavy wash that we encountered on bedrock. During the past two years we have been prospecting by means of tunnels to ascertain the width of our pay streak and

strata in three weeks to keep us occupied the rest of the season on the lower wash, so that having abundance of water for 20 days each year, we expect to remove sufficient top material to keep our shovel running steadily.

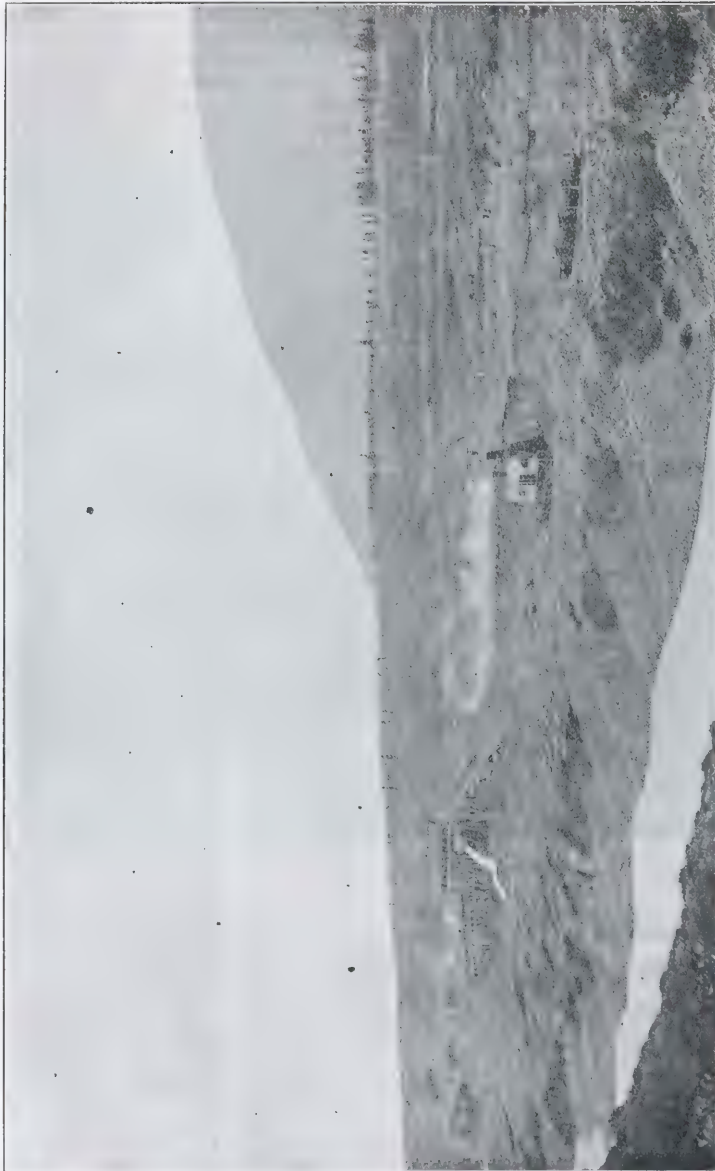
"The steam shovel plant will have a permanent washing station on the top of the hog-back, just below the camp, and the Christopher flume will be extended 4,400 ft. beyond the point graded to the washing station. All boulders will be hydraulicked before passing over the grizzly. The steam shovel to be installed will have a dipper, so that all boulders, up to 5 ft. in diameter, can be handled. This will do away with a great deal of blasting.

"One of the heavy expenses connected with the hydraulic is the cost of maintenance of a long line of sluices and block riffles. This we hope to obviate by

having a good dump and steel riffles, with a reasonably short sluice, not to exceed 600 ft. It is our ultimate intention to put a double-track railroad to Atlin Lake, but it is deemed more advisable to make

Pine and Gold Creeks this season, but those who did seemed well satisfied with results.

Of the companies, the Pine Creek Power Company, Ltd., was the most successful, the North Co-



The Atlin Consolidated Mining Company's 70-ton Steam Shovel, Sluice Boxes, etc., on Pine Creek, Atlin.

a success of this plant before attempting to put in the large one.")

PINE CREEK.

Not more than 30 individual miners operated on

lumbia Gold Mining Company being second. J. M. Ruffner is president and general manager of both these companies; they seem to have had the most successful season in their history, with an aggregate

output exceeding \$70,000. The manager has again failed to supply me with the customary details of cost and methods of operation, but they appeared to pursue the method in vogue last year, viz.: running in powder drifts, shaking up the material with dynamite and then washing it down. They have employed a force of about 25 men between the two companies. Water was turned on early in May and used until about November 12. They are still encountering the same 'yellow deposit' referred to in previous reports, the deposit being astonishingly uniform and

On the Stephensville group of leases, which is also under Mr. Ruffner's management, nothing worth mentioning has been done this year.

The Atlin Consolidated Mining Company, promoted and organized by the Guggenheims of New York, who have acquired two prospects and leases formerly owned and controlled by the Atlin and Willow Creek Gold Mining Company, together with other leases and claims on Tar-flats, on the north side of Pine Creek, running practically from Discovery off to Gold River, has installed thereon a 70-hp



Individual Place Mining on Spruce Creek, Atlin, in 1905.

satisfactorily auriferous and shows no signs of exhaustion. These companies enjoyed a much better water supply during the latter part of the season, the result of the conservation of the waters of Surprise Lake by a dam built at the head of Pine Creek, the outlet of that lake. Had this dam (whereby a large quantity of water which ran to waste during the winter would have been conserved) been completed in the fall of 1905, as intended, a much earlier start could have been made, and no doubt would have resulted in a materially increased output. I understand it is the intention of these companies to increase the size and capacity of their ditches, flumes and conduits, to accommodate a much larger quantity of water than is at present possible.

Barry's steam shovel with a 4-cu. yd. dipper, capable of handling 6 cu. yd. per min., or about 3,000 cu. yd. a day of 24 hours.

This plant, under the superintendence of Thos. D. Harris, commenced operating about August 15, and was operated until October 25, in which time they moved a considerable quantity of gravel and cleaned up more than \$25,000, which must have been satisfactory to the parties concerned. This manager also failed to supply me with any details of the work done, quantity of gravel moved, cost of operation, etc., so that I cannot give fuller details. They operated night and day and employed some 36 men.

No work was done by the British American Dredging Company, Ltd., this year, beyond operating their

electric power plant at Pine Creek Falls, from which they supplied power to the steam shovel on Tar-flats, and to the B. C. Dredging Company's dredge at Blue Canyon while it was operated.

Very little work was done on Gold Run after the winter dumps were suliced, because the high pressure at which the North Columbia Gold Mining Company's ditch was run caused more water than usual to escape into the individual workings, which are all under ground, rendering them difficult and dangerous of operation.

From 90 to 100 men were engaged on Pine Creek and Gold Run during the season.

Spruce Creek Power Company, Ltd., under the management of W. C. Hall, with an average force of 16 men, spent about \$20,000 in prospecting work and in removing and changing plant, flumes, pipe-lines, etc., preparatory to next season's operations. This company failed to recover an amount equivalent to its outlay, but the gravel exposed at the close of this season's work is the most promising yet encountered, and it looks as if the pay-streak, known to exist on the property, is in sight. This company was also hampered for want of water, but not to the same extent as in former years.

The Northern Mines, Ltd., under the superintend-



An 84-oz. Nugget of Gold found on Spruce Creek in 1899.

SPRUCE CREEK.

On this creek between 210 and 220 men were employed during a portion of the season, including the company employees, and, while not as many were engaged in individual operations as in some former years, it is still first as regards the number so engaged and amount of output, which latter aggregated about \$77,000 as reported, and would be considerably more if fully reported. The operators not being so closely located as in former seasons, there was much less trouble in the apportionment of water and dump; so that, while troubles of this nature had not entirely disappeared, the difference was marked and appreciated.

Some of the best results obtained by individual operators on this creek were from re-slucing tailings which had already been washed once and had lain for a time exposed to the action of the elements, and from which more gold was actually recovered than by the first sluicing.

About 70 men are drifting on the creek this winter. Of the companies operating on this creek, the

ence of Henry B. Warren, operated its steam shovel for a portion of the season, but although working rich ground, the results cannot be regarded as satisfactory. A force of about 20 men was employed and about \$15,000 was recovered before operations were suspended owing to financial difficulties, which were due to causes over which the local management had no control. The property is in the hands of a receiver.

The British Columbia Dredging Company, Ltd., from the operation of whose dredge at Blue Canyon great things were expected, commenced in good season but only operated for a few weeks and then closed down, reluctantly admitting this dredge also to be a failure. The dredge worked well and handled the material satisfactorily, but for some reason appeared unable to save the gold. The failure of this dredge was a great disappointment to many others besides its owners, for had it proved successful the problem of how to profitably mine the large areas of auriferous ground which exist in this district would have been solved.

The Columbia Hydraulic Company did not attempt to operate this season, as its property was in the hands of its creditors. Its affairs are being adjusted, and it is expected that plant will be in operation next season.

A number of leasehold properties, such as the Kensington, Crown Group, Nora Joker, Gladstone, Calder, Peterborough, Gorgon and Little Spruce Group were worked, but little more than what would represent development assessment was done on any of them.

Options of purchase on behalf of Guggenheim Sons (so it is represented) were obtained last fall on most of the property on this creek, so that, possibly, entirely different methods of operation may be in vogue there in the near future. There is little

ators further up stream had a fairly successful season on **BOULDER CREEK.**

On this creek about 20 individual miners operated during the summer, making 40 altogether, including the company's employees. Results were satisfactory in most cases. There are 13 men drifting on the creek this winter.

The Societe Miniere de la Colombie Britannique, under the management of T. Obalski, M.E., assisted by E. Janne de LaMare, with an average of 16 men (maximum 20), operated from May 1 to October 20, running day and night shifts. The company uncovered about 1,600 sq. yd. of bedrock, winning therefrom some \$23,500, and, although the expenses for the season aggregated about \$19,000, the management felt much more hopeful than for several



First Steam Shovel in Atlin Camp—A Traction Machine placed on its Spruce Creek property in 1905 by the Great Northern Mines, Limited.

doubt that the installation of a properly equipped plant, with a sufficient supply of water to work with, will be amply rewarded, for there is much gold still recoverable even from the so-called worked out portions of the creek.

BIRCH CREEK.

About 16 men were engaged in mining on this creek during the summer, and three or four are on it this winter. Pearce & Co. having obtained a lease or lay on the properties formerly owned by the Atlin Lake Company, but now held by the Dominion Trust Company, commenced operations early in May, overhauling the plant, etc., and were ready for the spring freshet which began on May 18 and lasted nine days. After that date the water fell rapidly, and for most of the season they had very little for piping purposes. They, however, moved about 16,000 cu. yd. of gravel, recovering therefrom some \$5,000. Individual oper-

seasons past, owing to the discovery that the pay-streak ran under the benches on the west side and was richer than most of the ground they had hitherto been working. Some of the ground worked this season ran \$16 to the sq. yd. of bedrock and averaged \$14.50 to the sq. yd. for the season's work. This, with the fact that the increased grade of the creek (working up stream) provides such an elevation as will enable the company with a comparatively short flume line to secure much better dump and operating facilities, makes it hopeful for success in the coming season. Contracts have been let for driving two tunnels of 200 ft. each under the above-mentioned benches this winter, for the purpose of determining the width or extent of the pay-streak in that direction.

On the Non-Union lease a small force of men with

a small hydraulic plant did good work, resulting in material profit to themselves.

The decreased output from Boulder Creek is accounted for, not by a lack of gold in the gravel, but that not so much work was done this year. For this two reasons may be stated. One is that the comparatively large amount of gold reported by the Societe Miniere de la Colombie Britannique, as shown by 1905 report, was mostly produced by Black & Grant, who, with a steam hoisting and pumping plant, operated a lay on the company's ground. Neither this nor any similar plant was in operation there in 1906, and, therefore, there was no corresponding output. This alone would account for the difference in output during the two seasons. Another reason is that the perpetual injunction obtained in 1903 by the Societe Miniere de la Colombie Britannique against certain miners on this creek, practically restraining them from ground-slucing, has had such a deterrent effect that this year (1906) only half as many individual miners operated as in 1905.

for its profitable working, which capital the owners have not yet succeeded in securing.

WRIGHT CREEK.

About 12 miners were working on this creek during the summer, and, as usual, some of them were well satisfied, while others were not. Gierke & Co., who for five seasons have operated on the English Counties Hydraulic Syndicate's leases (Lincolnshire) and Surrey) and adjacent ground, with indifferent and disappointing returns, have at last struck it rich and have every chance of being amply repaid for their pluck. Such perseverance deserves commendation, and, in fact, would usually be similarly rewarded in this district.

OTTER CREEK.

On this creek there is another evidence of plucky perseverance and faith in the ground which promises to be well rewarded. I refer to the operations of Carmichael & Company, who own the Otter Creek Consolidated Group of hydraulic leases, situated on upper Otter creek, acquired and for a time held by the Otter Hydraulic Company, Ltd., and reconveyed



Dredging for Gold (since discontinued) in Atlin Camp in 1905.

Although the gold is apparently distributed through the gravel to a greater depth than on most of the other creeks, drifting operations are not satisfactory to the owners, for while a fair wage is usually obtained, they know they are not securing all the gold, the same area of bedrock or claim usually yielding quite as much more when afterwards operated by ordinary sluicing methods. Rather than invite vexatious and costly litigation, the individual and other holders situated on the upper portion of the creek have been holding off in the hope of some improved plan of operation, or of the whole creek being acquired by some company capable of controlling and operating it altogether.

RUBY CREEK.

Very little work was done on this creek during the season, as a considerable outlay of capital is necessary to open it up properly and install the necessary plant

last year to Carmichael and partners, the original owners. These operators commenced in April to move the plant, pipe lines, etc., and did a large amount of dead work, including the laying and riffling of 240 lin. ft. of sluice flume, 2 ft. by 3 ft. and laying a long length of supply pipe. They commenced piping on May 22, and between then and October 10, when their sluices were frozen up, with an average force of 5 men and a limited supply of water, they washed down 26,000 cu. yd. of barren dirt and more than 10,000 cu. yd. of "pay gravel" from which they obtained, approximately, \$4,000 worth of gold. They have left their plant and pits in excellent shape for an early start and successful operation next season. The banks on which they operated average about 18 ft. in height, with from 8 to 12 ft. of pay gravel, yielding from \$2.34 to \$3.16 per sq. yd. of bedrock and over 50 cents per cu. yd.

This property is now owned by a small close corporation which has several leases of apparently good ground, and a plant is installed consisting of about one mile (5,240 ft.) of supply flume, 29x39 in., 2,600 ft. of steel pipe lines, 600 ft. of sluice flume, two No. 3 Grants, the usual supply of mining tools, blacksmith shop and outfit, and comfortable dwelling house, cabins and barn. It is intended to establish a system of reservoirs next season, for which the physical conditions are said to be favourable, so that very good results may be expected from future operations.

Another group of leases on lower Otter is held under bond by Mahuin, Jamieson & Co., who did considerable prospecting on them last season, with encouraging results, and preliminary arrangements have been made for the installation of an hydraulic plant next year.

VOLCANIC CREEK.

On this creek four men worked all the season without reaching bedrock, having had a heavy inflow of water and many other difficulties to contend with; however, they met with such encouragement as made them determined to continue next season until bedrock shall be reached. This is still another case of that perseverance which deserves success.

WILSON CREEK.

This is a tributary to O'Donnell River and hitherto has not attracted sufficient attention to be worthy of mention. It is one of the many creeks which, in 1898 and 1899, were staked from end to end and afterwards abandoned. Subsequently a portion of it was located in hydraulic leases, but no development work was done and the leases were cancelled. The creek was then open for two years, but last winter a new discovery was made, and 90 or more claims were located on it. Considerable prospecting was done during the summer, but owing to the scarcity of labour and the lack of capital, no persistent work was done except on Discovery claim, on one or two claims on either side of it, and on several others. On Discovery claim the operators realized from \$25 to \$30 a day each, and this winter some comfortable cabins are being erected and other preparations made for more persistent and systematic work next season.

O'DONNELL RIVER.

On this river only four men did any work this year. They were operating on the Gold Hill group of leases owned by Robert McKee, and put out a dump last winter which was believed to be valuable. They were, unfortunately, quite unprepared for the freshet when it came in the spring and lost most of their dump. They then sluiced until some time in September with gratifying results, winning about one oz. per day per man. Work was suspended because the flow of water was too great for the pumps in use, and steps had to be taken to procure more efficient appliances. It looks now, however, as if either a steam shovel or a dredge will be installed on the property, definite action to that end having been taken.

GOLD BOTTOM CREEK.

This is a creek situated beyond the south end of Atlin Lake, tributary to the Skoko River, a district

in which no other placer properties are held, but a group of leases has been located upon the creek, and active prospecting was commenced in November by an American concern having a lead on the property.

Four or five men were busy prospecting on Gold Bottom Creek, and then, and the usual difficulty with water is embarrassing them, and they will likely close down until they can install efficient pumping apparatus. All the physical conditions are favourable, viz., high gravel banks, good dump, plenty of water and timber, and it only remains to be demonstrated that there is gold in paying quantities to prove the property valuable. If this property proves worth working it will lead to extensive location in that part of the district, which so far has received little attention.

LINCOLN DISTRICT.

This creek is a tributary of Teslin Lake and attracted some attention last year, there having been a number of placer claims located. Some desultory prospecting was done and three or four men spent most of the season on the creek, but did not accomplish anything worth mentioning.

CONSOLATION CREEK.

The same may be said of Consolation Creek, another tributary of Teslin Lake situated near Lincoln Creek, and on which two or three men have spent two seasons prospecting, but without finding bedrock, the ground being deep and somewhat difficult to work.

GENERAL.

The success of the steam shovel on Pine Creek will doubtless direct more attention to that style of plant and method of operation, as being the best yet suggested and adapted to the peculiar nature of the material found in this district, there being seemingly but one serious objection to it, viz., the cost of the fuel, which will soon be scarce and costly. It is expensive now and will become more so as the timber is consumed. If electric power can be successfully applied instead of steam, that objection will be overcome, for water-power is plentiful throughout the district.

MINERAL CLAIMS.

The active development carried on by Col. J. H. Conrad and associates on the Yukon side of Windy Arm, Tagish Lake, gave an impetus to prospecting and a large number of mineral locations were recorded around Tumbler Lake, and in fact all through the district. The surface showings on a number seem to indicate the existence of valuable ores therein. Sufficient development has not been done anywhere to justify definite opinion as to values. On most of the properties about Atlin only sufficient work has been done to lead them to the conclusion: several Crown grants have, however, been applied for.

The mineral leases in and about Riley Hollow, on the Klondike River, in the southern corner of the district, have attracted considerable attention during the past season, and the belief is now that a major camp will be established there in the near future. Upwards of 100 claims have been located apparently

on ledges of what is said to be self-fluxing copper ore, which also carries values in gold. The limited amount of development so far done has tended to justify and increase the high expectations induced by the surface indications. There have also been discovered in the same vicinity ledges of galena, molybdenum and other metals.

The above-mentioned claims are situated between 50 and 60 miles from tide water at Haines, Alaska, and about 10 miles beyond the International Boundary at Pleasant camp. Numbers of the claims are held under bond by British and American capitalists, who profess to be about to vigorously prosecute development.

There is another group of claims located two to five miles from the International Boundary, and therefore nearer tide water, but on which little development work has yet been done.

Altogether, there is good justification for the belief that the whole northwest portion of the district, from the International and Yukon boundaries through to Bennett, Tutshi and Atlin will be the scene of active mineral development and operation at no very distant date.

MINING IN VARIOUS PARTS OF BRITISH COLUMBIA.

Excerpts from "Annual Report of Minister of Mines" for 1906.

ADDITIONAL INFORMATION from official sources to that already reprinted from the "Annual Report of the Minister of Mines" for 1906 is given below. Like those previously published in the MINING RECORD, the following reports were supplied to the Provincial Bureau of Mines, chiefly by gold commissioners, and mining recorders:

ARROW LAKE MINING DIVISION.

Not much mining has yet been done in this division, but it is expected that with the establishment of the zinc mining industry on a profitable basis will come much activity on Pingston Creek. The mining recorder reported for 1906:

"The Government expended \$2,000 upon 6½ miles of wagon-road from the Arrow Lake towards the Big Ledge, the work done consisting of bridging and blasting out rock; there are still 1½ miles to be finished. The property is reported to contain a large deposit of zinc ore.

"Monarch Group.—This group is situated on Big Ledge, Pingston Creek, and comprises the Monarch, Empress, Delenger, Anna S., Maple Leaf, Ontario, Forest Chief and White Heather mineral claims. The width of the vein is 316 ft. On the Monarch there is an open cross-cut, all in zinc ore, assaying 30 per cent. zinc, and there is another band of zinc ore 24 ft. wide. In Anna S. gulch and Delenger gulch there are exposures of 40 ft. each of zinc ore. On the Empress, on the west side of Empress gulch, the vein is exposed for 550 ft., showing 40 ft. in

width of zinc ore, and 4 ft. of concentrating galena. The zinc ore assays 47 per cent. zinc. The owners of the Monarch group have constructed this season six miles of wagon road from Arrow Lake towards the mine, and have expended some \$4,000 on the works.

"The Adventurer group is also on the Big Ledge, and consists of the Adventurer, Sunshine, Outlook, Watchman and Iron Duke. The ore-showing as to quantity and quality is similar to that on the Monarch group. The owners are trying to negotiate a sale or bond.

"On the Millie Mack, situated on Cariboo Creek, 16 miles east of Burton, on the opposite side of the lake from Pingston Creek, a force of men has been working all season to tap the vein at depth."

GOLD IN THE PEACE RIVER COUNTRY.

Concerning reports published last year relative to discoveries of gold on the Peace River, the provincial mineralogist observes:

"In the spring there had been some rather sensational accounts in the Coast newspapers, which were credited to Mr. Macdonnell, of the Dominion Government Exploration party, as to some wonderfully rich locations, made by him and his friends, on the banks of the Peace River, some 17 miles below Fort St. John, which were reported as being very rich in gold. Mr. Beeton, who acts as Deputy Mining Recorder for this part of the Province of British Columbia, went with the Provincial Mineralogist to those locations and showed where the prospecting had been done. The locations had been made on the north bank of the river, where the river had cut into the bank and exposed a face, in places, 50 feet high, showing the strata to consist of alternating beds of dark, earthy shales, of Cretaceous age, often containing nodular clay iron-stones and calcareous sand-stones, which latter were found to be frequently impregnated with iron sulphides. These beds are seen in the river banks for many miles, having a slight dip to the east and forming the underlying beds of the prairie district. In common with most of the similar formations of the region, these deposits will, when crushed, occasionally give colours of gold, which may or may not have been derived from the present stream. Samples were taken of, what appeared to be, the most highly mineralized portions of the beds carrying the iron pyrites, and the highest assay obtained was about \$2 in gold to the ton. No development work had been done on the properties since they were staked, and as the 'Record Year' had just about expired, it is reasonable to suppose that the claims had been abandoned.

"The first locations are reported to have been made by a prospector named Mulligan, who had been employed as cook for Mr. Macdonnell's party. Mulligan was met by the writer at Fort St. John, and said that he had disposed of his holdings to Mr. Macdonnell.

"The circumstances serves to bring attention to the fact that much of the country contains gold, if

only in relatively small quantities, and this may be the source of the gold already mentioned as having been found on bars, etc., in the Peace River."

STIKINE AND LIARD MINING DIVISIONS.

The gold commissioner's sixteenth annual report on the mining operations in the Stikine and Liard mining divisions of Cassiar district, is as under:

"No very marked improvement in the season's operations over that of other years can be reported, yet the result may safely be said to be encouraging for the future. The amount of prospecting in new fields during the season has been small, but that done at least showed a revival of mining activity.

"During the summer a party, guided by an Indian, went out from McDame Creek in a southeasterly direction for a distance of, approximately, 80 miles to the watershed of Black or Turnagain River, where the Indian knew of a large body of quartz. The result of the expedition was that some claims were staked and recorded, and it is said that assays of the rock obtained went from \$31 to \$114 to the ton, in gold, silver and copper. These results were from crude methods, and it was thought that by scientific assays better results would be obtained. For this purpose some of the ore was taken to Chicago, and it was promised that I should be advised as to the result of the assay made there. I regret to say that I have not heard any more about it. However, I feel that there will be more or less attention paid to the locality mentioned during the coming season. The country in question is approximately 250 miles from this place by the route at present travelled, of which 100 miles can be made by water in the open season.

"A party of three prospectors, looking for placer diggings, went across from the head of Dease Lake to the headwaters of the west branch of Black or Turnagain River, which can be reached some 35 miles from the lake. These men, so far as I know, found nothing rich enough to work, but it is said they obtained encouraging prospects in several places, and I understand it is their intention to return to the place next summer better equipped for a season's work.

"Some prospecting for quartz was done on the lower part of the Iskut River, where some fair-looking ore was found in place. Several locations were made, but it seems that when the rock was assayed it was found to be worthless, or at least not of sufficient value to encourage further expenditure.

Stikine Mining Division.—The first north fork of Clearwater River is a large stream and may be said to be unmanageable from any ordinary mining point of view, as it contains a large volume of turbulent water the whole year round, and the greater portion of it is said to be confined between narrow walls of rock. About four miles, however, of the lower part of the stream is not so closed in. This occurs just before it joins the main Clearwater River, and here wide flats and bars have been made by the wash from above. The mouth of this stream is distant, approximately, 40 miles from Telegraph Creek by water.

Gold was discovered on the creek a few years ago, and on October 31, 1904, the partnership of Conover, Wilson & Jackson recorded a creek lease, where the stream leaves the canyon to flow over the stretch mentioned. So far the company has confined its operations to working a high bar at the upper end of the claim, and the work has been carried on in the old ordinary sluice-box method, without the use of any modern appliances. The results obtained from this manner of operating have been fair, and I think should prove that some good deposits of gold may be found. So far no attempt has been made to sound the present channel.

"On the opposite side of the Stikine River from the mouth of Clearwater River are located the August, Mountain Goat No. 1 and Mountain Goat No. 2 mineral claims, owned by Lewis Kirk. These are said to be good ledges of copper ore. Nothing more than the necessary amount of assessment work has been done on these claims.

Liard Mining Division.—One creek lease at the mouth of Dease Creek was recorded during the season, and two hydraulic leases have changed hands. No extensive operations have yet been commenced on the creek, and what little gold is being taken out is from desultory mining.

"Thibert Creek has been and is yet a good producer of gold, and on it are the large holdings, comprising ten hydraulic leases, of the Berry Creek Mining Company, Limited, now under the management of D. R. Irvine, of Victoria, B.C. This energetic company can truly be considered as being the present mainstay of the district. It has been confronted during the several years of its existence by the numerous obstacles and drawbacks met with by operating in a locality like this where the seasons are so short and transportation facilities uncertain and expensive. The company has now installed, at an enormous expense, large monitors, pipe lines, miles of ditches and flumes, and the whole plant and everything in connection with it is ready to operate on a large scale. The result of the past season's washing did not quite meet the expectations of those interested, yet it has established the important fact of the presence of gold in paying quantities.*

"There are a few Chinamen working on the creek who manage to make a living.

"McDame Creek, with its several tributaries, is another substantial reminder of the early mining in the district, for it also yielded a goodly supply of the yellow metal. There are 13 creek and hydraulic leases on the creek and tributaries, but as yet nothing more than development work has been done on any of them, excepting that of John P. Allen, located at the mouth of Snow Creek, which is said to be producing a fair return, considering that it is worked without machinery of any kind.

"The Seattle Prospecting and Development Company, of which John Ley is manager, controls sev-

*A full account of this company's progress and record in prospecting for the Dease River is published in the *Mineral Record* for December, 1906, pp. 487-491. Editor.

eral leases on the creek, and the company has attempted to install machinery there for two successive seasons, but owing to unavoidable breakdowns on each occasion, very little headway has been made.

"Quite a number of quartz claims have been recorded on the creek and in its near vicinity, some of which are said to be very promising properties. Nothing more than actual assessment work has been done on any of them. Several of these claims are controlled by John W. Haskins, of Victoria.

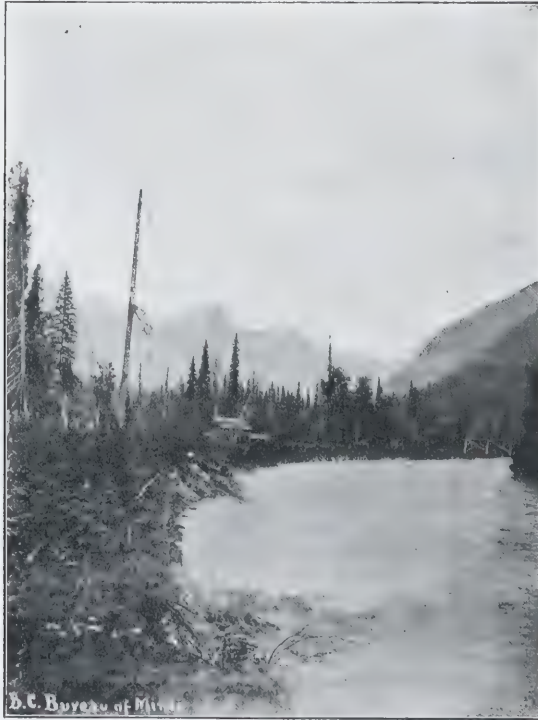
"Rosella Creek is the name of stream on which the

tracts that have never even been seen by the prospector."

ALBERNI MINING DIVISION.

Excepting on a few properties, there was little done in this division beyond what was absolutely necessary for assessment work. The exceptions reported by the gold commissioner were:

"On the Big Interior active operations have been carried on all summer and fall. This is a very promising property, and results so far have been satis-



Downie Creek, Revelstoke Mining Division.

Rosella Hydraulic Mining and Development Company, Limited, of Victoria, has four creek and five hydraulic leases. The operations of this company, under the management of J. W. Haskins, have been confined to preliminary work about the ground and getting the hydraulic plant to the claims. This property is the most remote of any taken up in the district, hence the expense of instalment has been heavy, and it has also been necessarily slow. I understand that everything can now soon be put in shape to reimburse the projectors.

"It is hardly necessary for me to mention here that in this part of the Province there is a very great deal of unexplored country and many mountainous

factory.

"On the Phoenix Group work has been carried on all summer, and is still continued.

'Mr. Bailey has worked the Three W's until quite lately, when weather conditions prevented the continuance of operations.

"The Sarita and Copper Island group were actively worked for some time during summer, and further development of these properties is expected.

"The mining industry in this division may be pronounced dull."

CLAYOQUOT MINING DIVISION.

"The year has seen very little activity in mining

operations in this division; in fact," reported the mining recorder, "it has been quieter than in any other year since the recorder's office was opened here in 1898. The only property worked to any extent was the Good Hope group of claims. The owners, the Helga Gold and Copper Company, of Seattle, had from four to six men at work most of the year tunnelling, but they have closed down until spring, when they expect to sink on the property.

"Owners of other claims have confined themselves to doing the annual amount of assessment work, and quite a few have had their claims surveyed, with the object of having them Crown granted. From present hearsay, a number of the properties will be working early in 1907, noticeably the Indian Chief group, at Sidney Inlet; the Good Hope group, at Trout River; the Ormond group, at Ahousat; the Brown Jug group, at Hesquoit; the Kallapa and Golden Gate claims, at Disappointment Inlet, and the Rose Marie group, at Kennedy Lake."

QUATSINO MINING DIVISION.

The annual report of mining operations in the Quatsino mining division consists chiefly of the following review by the mining recorder:—

"Ingersol River.—The Blue Bird group consists of two claims, Mystic and Blue Bird, owned by P. Cramer & O. Strandwold. An additional 7 ft. has been driven in the tunnel on the Blue Bird, and surface stripping shows ore to a considerable extent. The property has recently been sold on option to A. F. Gwin, of Vancouver.

"The Ingersol, Stella and Olga are owned by B. O. Erickson & Wm. Hanson. The work done this year consists of 8 ft. of tunneling, open-cuts and stripping, with satisfactory results.

"Other properties on Ingersol River are the Elk, owned by Frank Patterson; Hemlock, by J. L. Leeson, and Eureka, by Edw. Frigon; all of which have had the annual assessment work done on them during the season.

"South East Arm.—No work has been done on the Yreka mine during the year. The provincial assayer, in his report on Quatsino Sound, fully described the property in the Annual Report of the Minister of Mines for 1903. No work worth mention has been performed since that time.

"The Edison, adjoining the Superior claim of the Yreka mine to the east, and formerly owned by the Edison Mining Company, was sold to B. J. Murphy & J. D. Murphy in June, 1905, and Crown granted during 1906.

"The Climax, owned by Evenson, Sorenson, Lokken, Bergh & Sherberg, adjoins the Yreka mine to the north, and lies higher up the mountain. This property has been prospected during the season and shows a well-defined lead running the full length of the claim. The lead is about 4 ft. wide, carrying copper, gold and some silver.

"The Uncle Sam, owned by H. S. Butler, is a continuation of the Climax lead to the west. The lead has been exposed for some distance by open cuts and stripping.

"The King Edward, owned by Sherberg & Nordstrom, is situated to the east of the Yreka mine, and adjoining the Comstock claim. This property was formerly known as the Blue Grouse. The ore is copper pyrites, carrying small values in gold and silver.

"The Paystreak group, situated on Teta River, consists of three claims, the Paystreak, the Royal and the Red Rock. This is a promising property, having a well-defined lead, which has been exposed by open-cuts, shafts and stripping for more than 2,000 ft. The owners are P. Cramer & Fred. Pollock.

"The Annex is an extension of the Paystreak lead, and belongs to the same owners.

"The Quatsino King, the Rubicond, the Hill Side and East Side are owned by Chris. Nordstrom & G. Sorenson. The work done during the season consists of open-cuts, and the old tunnel on Quatsino King continued 10 ft.

"On the Louise, owned by Ed. Evenson & B. C. Lokken, assessment work has been carried on from year to year.

"The June group, under the management of G. Harold Grant, has been worked in a small way for the best part of the season, and is showing up well under development. The tunnel which was started in July, 1905, is in about 420 ft., and two cross-cuts have been made, 28 and 30 ft. Two orebodies have been struck in the tunnel; one that is 50 ft. in the main tunnel, and a cross-cut of 30 ft. was made, all in ore, besides some smaller showings. Assays of ore from the tunnel give higher values than from the surface. A test shipment of 145 sacks taken from the open quarry on the June claim, was made in February to the Crofton smelter, but the values are not known here. Work was closed down temporarily in September, and I am informed that it is the intention of the management to start work again in the early part of 1907, by installing an electric plant with sufficient power to operate four or five drills. Power for mining operations can easily be obtained from Link Creek, which flows through the Amazon claim of the June group.

"The Peerless, owned by Julian Satre and situated to the east of the June group, also shows up well. Assessment work this year consisted of a 5-ft. shaft on the lead and some surface stripping.

"The Morning Glory, situated to the west of the June group and owned by Sherberg & Bergh, is another promising property.

"The Rossland, owned by H. A. Thorn, has been thoroughly prospected this year and shows several small deposits of galena and silver-ore. Good open-cuts of 4 ft. tunnel, cross-cuts and stripping.

"The Minerva fraction, owned by D. A. McDonnell, lies between the Olga and Iron Knob claims of the June group. This property was surveyed two years ago, and, having sufficient work done on it, a Crown grant will be applied for.

"Other claims in the vicinity of the June group are the Lenore and Victoria fraction, owned by A. F. Moscovitz; the Alpha and Prince Edward, by

Sherberg & McDonell; the Independence, by H. A. Thorn, and the Dundee, by D. A. McDonell.

"The Andrew, owned by Frank Patterson, has recently been sold to a Seattle syndicate and work is already started. Only a few days' actual mining has been done since the camp was established. A few sacks of copper sulphide ore were shipped by last steamer for a smelter test.

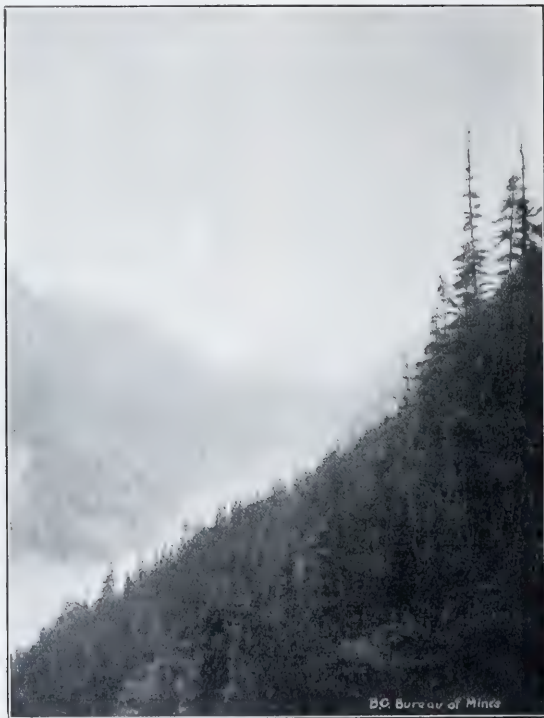
"West Arm.—The iron property situated on the north side of West Arm comprises 36 claims and is owned by J. A. Moore & Wm. Pigott, of Seattle, Wash. A considerable amount of work has been

"The Nel and Stella No. 1, owned by James A. Moore & Ray C. Price, are other promising properties which were located last summer, and from the work done showings are very satisfactory. The ore is bornite.

VICTORIA MINING DIVISION.

The mining recorder's report of mining in this division contained the following:—

"Vancouver Island Mining and Development Company, Limited.—The work done by this company has been concentrated on Koksilah Mountain,



Looking up the Kemano River, Gardner Canal, Skeena Mining Division.

done on the different claims during the year consisting of numerous open-cuts, pits and shallow shafts. The two largest cuts are 425 ft. long, 4½ ft. wide, 7 ft. deep; and 200 ft. long, 2 ft. wide and 4 ft. deep, all in ore. Some of the shafts are sunk 14 ft. deep. The results from this year's work are most satisfactory and large bodies of hematite have been opened up.

"A new discovery of iron was made by Chris. Jacobson & James W. Jackson and four claims, the Iron Meadow, Iron Meadow No. 1, 2, and 3 were located. This property is situated about 10 miles farther up the arm than that above mentioned and quite a distance back from salt water.

about five miles from Cowichan, a station on the Esquimalt & Nanaimo railway. From the Bluebell five carloads of ore have been shipped, ranging from 5 per cent. to 8 per cent. copper; several prospect shafts have been sunk, which have proved the existence of good copper to a depth of 60 ft. below the outcrop. Work was suspended at the end of November, as weather conditions were an obstacle to the extensive surface work that was being undertaken; it will be continued in the coming spring. Although it is too early yet to speak definitely, conditions appear to be favourable for the development of marketable ore.

"Tyee Copper Company, Limited.—While the

Tyee mine has been regularly reported on for the last few years, a few remarks on the past year's work will prove interesting. Tyee ore to the amount of 23,823 tons was smelted at the company's smelting works at Ladysmith. This produced 2,115,617 lb. of copper, 3,776 oz. of gold, and 77,085 oz. of silver, the cash returns, after deducting refining and freight charges, being \$396,500. The Tyee main shaft has attained a depth of 1,250 ft., and the same low-grade ore body has been met with that had been previously intersected at the 1,000 and 1,150-ft. levels. A winze has been commenced at the 1,150-ft. level, and this will be sunk from 200 to 300 ft., which will prospect the mine to a depth of about 1,500 ft. from the actual surface of the ground. At the same time, heavy prospecting work in the form of drifts and cross-cuts will be done in the lower levels, to follow

from the Richard III. There is now some 400 tons on the dumps ready to be shipped, and regular shipments will be made.

"San Juan District.—The necessary annual assessment work has been performed on a number of claims, but no reports of any import have come to my knowledge."

NEW WESTMINSTER MINING DIVISION.

"The number of claims recorded," stated the local mining recorder in his annual report, "exhibits a considerable increase over the year before, and shows that there is greater activity in prospecting than there had been for the two preceding years. Some good prospects have been found between Salmon Arm and Howe Sound, and it is the intention of the holders of the mineral claims recorded in that locality to do considerable development work during the



Sampling Mill at Tyee Copper Company's Smelter, Ladysmith, Vancouver Island.

up and explore the ore that has been exposed. Concentration tests are also being made, in order to find out the best method of utilizing the large tonnage of low-grade material which has been developed in the mine.

"In addition to the work at the Tyee mine, a shaft has been sunk to a depth of 500 ft. on the neighbouring claim, called the I. X. L., which is also the property of the Tyee Company. Several thousand feet of work have been done on this ground on a formation very similar to that on the Tyee, and the indications are distinctly favourable for pay ore.

"The diamond drills are also working continuously on the property. One of these has a capacity of 3,000 ft.

"Richard III. Mining Company, Limited.—The Tyee smelter has secured the contract for the ore

year 1907. There has been a great deal of prospecting in Howe Sound and vicinity, and also throughout the whole mining division, and it is expected that the year 1907 will show an increase over the preceding years."

During this summer the geological survey of Alaska is to be continued by 11 United States Geological Survey parties, several of which are already in the field. By further subdivision there will be 14 separate groups of explorers, comprising 20 technical men and 21 assistants. Five parties will study economic geology, five will make topographic maps in the Yukon-Tanana, one party will map the Kasaan Peninsula on Prince of Wales Island, and two hydrographic parties will study the water resources of the most important placer districts.

COWICHAN LAKE AND VICINITY.

By Wm. Fleet Robertson, Provincial Mineralogist.

COWICHAN LAKE and vicinity were visited last summer by the provincial mineralogist, whose report thereon is printed in the 'Annual Report of the Minister of Mines for 1906,' as follows:

CHEMAINUS SLOPE.

The claims on the Chemainus slope are situated on a small creek which flows into the south fork of the Chemainus River, and about two miles from its junction. The claims may be reached by a trail up that river, also by a trail from Cowichan Lake, which latter starts from a point a little to the east of the mouth of Cottonwood Creek. The former route would, eventually, be that over which any ore from this section would be taken out, and by which any important trail or wagon road would be built; but, for the preliminary development of properties and for prospecting purposes, the trail from Cowichan Lake is the one best suited, as, at present, supplies can be transported by wagon and boat to a point nearer the claims than by the Chemainus trail. I followed the Chemainus trail down some three miles below the junction of the creek mentioned, and found that it ran through finely timbered land, large trees with no undergrowth and little or no fallen timber, with a solid, stony and gravelly soil, unfit for agriculture, but perfect for a trail, over which a pack-train could be driven without any previous preparation; in fact, a line of blazes is the only trail work necessary. I am informed that these conditions prevail all down the Chemainus Valley.

Cowichan Lake is about 20 miles from Duncan station, on the Esquimalt & Nanaimo Railway, with which it is connected by a fair wagon road to the east end of the lake. A regular daily stage and a couple of independent stages are run over this road, making the distance in a little over three hours; there are no heavy grades on the road.

The elevation of Cowichan Lake is about 550 ft. above sea level; from the east end of the lake to the mouth of Cottonwood Creek, by water, is estimated at almost nine miles. The water of the lake is everywhere deep enough for any steamer, and a landing can be made on the beach at any point. A company logging on the lake has a small tug capable of towing scows or rafts, and, consequently, if so desired, any supplies or horses could be landed at the mouth of Cottonwood Creek.

The present Cottonwood trail to the summit follows the main creek up to "Doc's" cabin, at the junction of the east fork, which fork it then follows up to the summit. The summit is about nine miles from the lake, and at an elevation 2,000 ft. higher, some 2,600 ft. above sea level.

The claims located by Sherk, Jones and others are nearly a mile north of the summit, and at about 300 ft. lower elevation, about 2,300 ft. above sea level. I was given to understand that locations have been made two or three miles farther down the creek, and

at an altitude of about 1,700 ft. No work has been done on these and I was personally unable to locate them. The Cottonwood Creek trail is through magnificently timbered land, with no underbrush or fallen timber, and not a single standing tree has had to be cut to make the present trail, the few small ones that were cut serving merely to blaze the trail. The country traversed is almost entirely covered to a considerable depth by "wash," consisting of slide rock, volcanic in origin, embedded in clay produced from the disintegration of such rocks. More or less clearly-defined benches follow the course of present streams. The trail in question has been laid out with very poor judgment: it follows the first bench as far as the junction of the east fork, when it drops to the creek level, or follows the steep hillside bordering thereon, thereby necessitating an amount of side-hill cutting, and crossing in and out of ravines, with many "reverse grades," all of which might have been avoided by keeping to and following up the first bench, above the ravines and side-hills, with no greater distance to travel to the summit.

The country is smooth, with solid footing, no mud holes, and open to a degree scarcely comprehensible to one accustomed to the Kootenay districts, and is such that no Kootenay prospector would dream of asking for a trail through, for a pack-horse could go anywhere. The difficulty in this section is that there is practically no "horse feed" on the hills, and, for the small amount of work going on, it does not pay to bring in hay and grain with horses.

MINERAL POSSIBILITIES.

On the Cottonwood Creek slope there are few rock exposures and such few as were seen on the higher levels are much altered and shattered igneous rocks, in which I could not see any indication of mineral nor hear of any having been discovered.

On the Chemainus slope, in the cutting made by the creek, were seen sedimentary rocks, shales, siliceous limestones, etc., in contact with the igneous rocks mentioned. Near such contact are the mineral locations referred to, which, from the fact that most of the mineral locations of value on the Island are similarly located, gives these claims greater possibilities than the present meagre development has proved, and renders the locality well worth prospecting.

It was expected that some of the prospectors would be on the properties, but such was not the case, the snow having scarcely left the ground; consequently, having followed the blazed trail to the Sherk cabin, the various claims had to be found by tracing, from there, foot trails which had been made by the men when doing the work.

Cascade.—The Cascade is known as one of the Sherk claims, but the location post bears the name of George Lawrence, the date of location being August 21, 1902. This claim is located about a mile from the summit, and on the Chemainus slope, on a small creek flowing eastward into the south fork of the Chemainus River, and at an altitude of about 2,300 ft. The work has been done in the creek cutting just below small falls, where the solid for-

mation is exposed in the steep bank. Here there is exposed an igneous dyke of considerable, although undetermined, width, which exhibits a number of parallel vertical fissures from 1 to 2 ft. apart. Among these fissures has been deposited quartz, with some chalcocopyrite and bornite, together with a certain amount of magnetic iron oxide, which has been again enriched by a secondary deposit of calcite carrying copper sulphides. The width of these individual stringers is from 2 to 4 in., and they are apparently disconnected. The extent of the deposit, as at present exposed, is commercially unimportant. The amount of development work done at this point consists of an open cut about 10 ft. wide, and 6 ft. into the solid formation, with a height of face of about the same. In the open cut a pit has been sunk, of what depth it is impossible to say, since it has been nearly filled in again by the creek and rock from the face. A few yards farther down the creek a little surface blasting has been done, exposing a small amount of copper mineral. The workings did not disclose any defined strike or dip to the deposit. A sample taken of what might be considered the ore from the claim gave copper, 5.6 per cent.; silver, 0.2 oz. to the ton, and gold a trace. A short distance to the south of the creek some surface stripping and small cuts were seen, apparently on the same claim, which did not, however, promise as well as the creek exposures.

Still farther to the south, and towards the summit, were found the stakes of the Empire mineral claim, located by Jac. Sherk, on August 26, 1902, but no development work could be found. Mr. Sherk, however, who was seen later, says some work has been done here.

The stakes of the Hornet mineral claim, located by F. H. Lewin and Walter Jones, September 27, 1905, and also the stakes of the Wasp, were found, but no development work or exposure of mineralized rock could be found.

Mr. Jones, of Crofton, subsequently met with on Cowichan Lake, says he has a property, the Garnet mineral claim, lying to the south of the Cascade, and farther up the hill, upon which he claims to have driven a tunnel on a considerable deposit of copper sulphides, which he says is "a direct extension of the Cascade lead and assays a little over two per cent. copper (wet), with low gold and silver contents." These workings I was unable to find, or any trace of a trail leading thereto.

SUMMARY.

While I do not consider that the mineral so far exposed, in the workings I saw, has any commercial value, still, the rock formation is undoubtedly mineral-bearing, and the conditions are favourable for the existence of ore-bodies, and I think it would be advisable to encourage prospecting in the vicinity. I would, therefore, recommend that an expenditure be made on the trail from Cowichan Lake, sufficient to render it fit for use with pack-horses.

I would draw attention to the fact that all the land in this district is well within the Esquimalt & Na-

mino railway "land grant," to which company the "base metals" (copper and iron) are supposed to belong, and the claims only show nominal values in the precious metals (which belong to the Crown), and that, in my opinion, any permanent trail, or road, should be up the Clemanthus Valley, the claims lying within a couple of miles of timber limits already sold on that river.

Sunnyside and Here-it-is.—On the morning of May 31 a canoe was taken from the mouth of Cottonwood Creek to the mouth of Sutton Creek, a small creek flowing from the west into the Little Cowichan Lake, i. e., that portion of Cowichan Lake east of the narrows—at its western extremity. Starting at Venier's cabin, a trail was followed up the north slope of the Sutton Creek valley, which, gradually climbing the hills separating Sutton Creek from the main lake, for a distance for about one and a half miles, reached the cabin of the Sunnyside and Here-it-is mineral claims, at an elevation of about 400 ft. above the lake. These claims are owned by Messrs. Douglas, Shelton and Prevost. Considerable work has been done on the claims, but it consists chiefly of small open cuts and strippings and is so scattered as to give no definite idea of the deposit. The most extensive development work is No. 1 tunnel, elevation 550 ft. above the lake, which has been driven in about 35 ft., N. 24 deg. E., gaining thereby a depth at the face of only about 35 ft. from the surface. The rock formation is a very much altered and shattered igneous rock, with a high percentage of iron, and containing numerous red garnets along the fissures. Near the portal, the tunnel passed through a somewhat ill-defined body of copper pyrites, pyrrhotite and arsenical pyrites, which seemed to be deposited along and near a black, "slicensided" fissure cutting the tunnel. The inner portion of the tunnel was devoid of mineralization, having seemingly cut through the ore deposits in the first 10 ft. This tunnel starts on the Sunnyside ground, but in a few feet is into Here-it-is ground. An approximate sample taken of the sorted ore gave, upon assay: Copper, 9 per cent. (wet); silver, 0.3 oz.; gold, trace. A special sample taken of the pyrrhotite and the arsenical-pyrites assayed: Copper, 5.6 per cent.; silver, 0.2 oz.; gold, trace.

Some 40 ft. vertical above the tunnel there is an iron capping containing copper and iron sulphides, with iron oxides, on which a little stripping had been done. Scattered over an area several hundred feet wide, there are a number of these exposures of mineral, but in none of them has sufficient work been done to show whether the mineral, which shows on the surface so abundantly, is a "surface flow" or whether it continues with depth. One of the ore exposures occurs near an outcrop of lime, which lies above the workings, but, as far as could be seen, not lying on such contact for any distance. Above the outcrop mentioned was a quartz vein of irregular width, carrying a small amount of copper sulphide. The owners report a similar, though stronger,

quartz vein some 250 ft. vertical higher up the hill, also carrying some copper.

Peterson.—The Peterson claim is situated on the east side of a small creek, dry in summer, which flows into the extreme western end of Cowichan Lake, and is at an elevation of about 300 ft. above the lake and half a mile from the mouth of the creek. To reach it from the end of the lake, the old Nitinat wagon road, now almost overgrown, is followed up for about a quarter of a mile, when the trail strikes off to the right, up the hillside. In the face of an overhanging cliff a narrow seam in the country rock shows a small percentage of copper ore, but not any great quantity. From this showing a tunnel has been driven in to the northeast for a distance of 15 ft., along a fissure in the rock; the cost of the work done was estimated at about \$100. The shattered character of the rock in the roof of the tunnel and the overhanging cliff renders the workings absolutely dangerous for men to work in; but a prospect of this class does not come under the operation of the "Metalliferous Mines Inspection Act." The property is owned by Mr. Peterson, of Duncan. No ore could be seen in the tunnel workings, nor in the vicinity, except in the seam already mentioned. The country rock is a highly-altered shale, much shattered and cut by fine-grained igneous dykes. A sample taken from a small pile of ore at the tunnel mouth assayed 1 per cent. copper, with traces of gold and silver.

Paget Claims.—From the shore of Cowichan Lake, about $1\frac{1}{2}$ miles east of the mouth of Nixon Creek, a trail, four miles long, leads up over the summit of the hills to the south of the lake, on to the slope drained by the Gordon River. Here a large amount of work has been done on a group of claims by a Mr. Paget, an Englishman not now in this country, and whose local representative is not known. Large log buildings, consisting of an office and store-house, bunk-house, cook-house, blacksmith shop, etc., were built, but, as the property has not been worked for some years, these have nearly gone to ruin. The principal workings are at an altitude of 2,650 ft., and consist of an upper tunnel driven N. 70 deg. E. into the hillside for about 60 ft., with, near its inner end, a cross-cut to the left of 5 ft. and another to the right of 10 ft. At some 50 ft. lower elevation another tunnel, nearly in line with the upper tunnel, had been driven for, it is reported, 60 ft., but, as it was flooded with water dammed back by fallen material, this could not be verified. This lower tunnel seems to have been in gravel for the greater part of its length, and no ore was visible. The upper tunnel is on a well-defined quartz vein about 6 ft. wide, the mineralization consisting of arsenopyrite, pyrite zinc blende, and a little galena. Very fair gold values are reported to have been obtained in the working of the property, but these values must be "spotty," as samples taken of the most promising looking arsenopyrite on the dump yielded negative results. The quantity of galena is insignificant.

There are a number of other claims in the vicinity

of the lake, or a few miles back, notably "Doc's" claims up the Robertson River, but the exact location of these was not known and no guide to them could be found, so they were not visited.

The Ontario Bureau of Mines reports the staking of a number of copper claims in Dunnett township, west of Sturgeon Falls on the main line of the Canadian Pacific railway where discoveries of chalcopyrite and bornite have been made. No development work has so far been done.

Fred. H. Moffit, assisted by A. G. Maddron, has been detailed by the United States Geological Survey to this summer examine the copper deposits of the Chitina River, a tributary to Copper River which flows into the Gulf of Alaska in the vicinity of Prince William Sound. Much development work has been done in the Copper River district and railway construction is in progress from Katalla to the copper-bearing regions.

The discovery of tin ore on Moran prairie, six miles east of Spokane city limits, is reported. The claims are stated to be in the midst of orchards. They are described as situated on a zone of greisen and granitic schist, with metallic ores cropping out in places. This zone is 750 ft. long and 500 ft. wide. An open cut is 50 ft. long with a face 20 ft. deep. In the face there is "a width of 8 ft. of good ore." On the hanging-wall side of the paystreak is lower-grade mineral, and on the foot-wall is a 6-in. streak of wolframite and scheelite. It is further stated that the discovery of tin ore on Moran prairie was reported 20 years ago, when a number of claims were staked but no development work was done.

As a part of its Twelve-Mile-Klondike water supply system for hydraulicking on Bonanza and other Yukon creeks, one of the Guggenheim companies—the Yukon Consolidated Goldfields—is constructing a redwood inverted syphon line some 14,000 ft. in length. This wood line is being built over rolling and rugged country where the dip is not of sufficient depth to require steel, yet conditions are not favourable to trestle-building or making a detour for a ditch. The redwood pipe, about 2,000 ft. of which have been constructed, is 48 in. inside diameter. The length of the staves varies from 10 to 24 ft., their width is $5\frac{5}{8}$ in., and thickness $1\frac{5}{8}$ in. In constructing the pipe the staves are broken at alternate joints, so continuously overlap. They are held in place by round rods of half-inch soft steel. The staves were taken from California to the Yukon last summer, landed at Twelve-Mile on Yukon River, and during the winter hauled in sleighs along the pipe line. Construction is under the direction of C. W. Bromley, who is expert at this class of work and who lately completed in Utah a line 10 miles in length and of similar material. Completion of the Twelve-Mile line before next winter's snow shall fly is expected.

COMPANY MEETINGS AND REPORTS

TYEE COPPER COMPANY, LIMITED

The annual meeting of the Tyee Copper Company, Limited, was held at the Hotel Vancouver, Vancouver, B. C., on June 10, ult. The chairman of the company, Mr. T. H. Wilson, presided, and the following reports and statements of accounts were submitted:

DIRECTOR'S REPORT

"The directors hereby submit the audited Statement of Accounts from May 1, 1906, to April 30, 1907.

"The prospecting and developing at the mines have been carried on persistently during the past year, both at the Tyee and X.L. mines. The results, however, up to the present, have not disclosed any new ore-bodies, although the general manager, as you will see from his report, owing to his local knowledge, continues to maintain a hopeful attitude, and this seems justifiable in view of the large area of the company's property still unexplored.

"You will be asked to approve of a recommendation by the board to pay a dividend for the year at the rate of 7½ per cent. per annum. This dividend will be payable on August 1 to all names standing on the Register of Members of the company on June 4, 1907.

"It is a matter of congratulation that at this stage of our history, when the present known ore-bodies in the mine are being depleted, that the business in smelting custom ores has satisfactorily increased, and the directors look forward to considerable improvement in this department for the future. This may necessitate some additions to our smelting plant, and proposals to that effect are being considered.

"The retiring directors at this time are Messrs. T. H. Wilson and H. Loeffler, the latter gentleman having succeeded to the vacancy caused by the death of Mr. Ludwig Loeffler. These gentlemen are eligible and offer themselves for re-election.

"The retiring auditors, Messrs. Everett, Morgan & Grundy, also offer themselves for re-election."

The reports of the general manager, the mine superintendent and the smelter manager, which give details and represent the opinions of these officials in their respective departments, follow:

GENERAL MANAGER'S REPORT.

Mr. Clermont Livingston, local director and general manager, reported:

"I beg leave to enclose annual reports from the mine superintendent and smelter manager for the financial year ending April 30, 1907, which I confirm. In reviewing these reports, I shall follow my usual course and take the mine first.

"As you will see from the mine superintendent's report we have, during the past financial year, shipped 21,567 tons of ore to the smelter, which has yielded a good profit.

"Mr. Bryant in his report has dealt exhaustively with the various development works that have been carried into effect during the past twelve months. This work we consider has practically proved that the main ore-body of the Tyee mine has been formed in a synclinal fold of the graphitic schists. This main ore-body has, moreover, been practically exhausted, and all that is now left is a small quantity of good ore lying near the surface and situated between the old No. 2 shaft and the western boundary of the Tyee claim. The north lode is so broken that no calculation of tonnage from that quarter can possibly be made, and, although this lode probably traverses the entire claim, the ore contents may be so separated by barren material as to make it unprofitable to work. If this should prove to be the case, shipments from the mine may shortly have to be suspended until another ore-body has been found.

"Although the not finding a payable ore-body immediately below the main ore-body that has been so successfully worked on the Tyee claim has been a great disappointment to us all, this work has shown us what formation is necessary for the

bright as they appeared twelve months ago. Fortunately, though, the company owns a large number of claims outside of the Tyee claim, and it is probable that some of these will have demonstrated the existence of graphitic schists.

"On the X. L., although a payable ore-body has not yet been proved, the graphitic schists and the formation generally is identical with that on the Tyee, and further development work, both by shaft and diamond drill, has been laid out. In reference to this I may remark, that on many parts of the Tyee less than 100 ft. of ground vertically would have entirely covered the ore, and so work above or below these points would have been in barren ground. This adds greatly to the difficulties of prospecting, as another trough may exist in the X. L. and yet so far have been missed. The knowledge we have gained from recent work has, however, enabled Mr. Bryant to formulate a scheme for further testing this ground and which I trust may be successful.

"With regard to our property to the south, graphitic schists have been found on the Doubtful, Thelma, and Imperial, all of which claims are the property of the Tyee Company. This gives us a stretch of ground 4,000 ft. in length, or nearly three times greater than the ore-bearing zone of the Tyee from which such good results have been obtained. These claims will be carefully prospected during the coming summer, and if the carbonaceous material contained in these schists is a necessary factor in forming the ore, we should have a good chance of finding another ore-body in this ground.

"The ore-bearing zone on the Tyee has a length of 1,400 ft., and from this small stretch of ground, as you will see from the mine superintendent's report, we have so far shipped 165,983 tons of ore, containing 14,715,336 lb. of copper, 465,466 oz. of silver, and 24,013 oz. of gold. This is a good record, and one which has not so far been equalled by any copper mine on the North American coast, from the International Boundary line to and including Alaska. It would appear almost impossible for such an ore-body as that to live alone, and I still believe the future will prove there is more ore in the hill than has yet been discovered. I cannot close this portion of my remarks on the mine without saying that Mr. Bryant has proved himself to be a first-class mining engineer, and that the works entrusted to his care have been carried on with skill and energy.

"Turning now to the smelter—you must bear in mind that the business carried on by the Tyee Copper Company is of a two-fold nature, viz., mining and shipping the products of its own mine to its own smelter, and a smelting business for outside or custom ores. I am much gratified in telling you that, although the work carried on for the past twelve months at the mine has been of a negative character, the smelting part of the business has shown a marked and positive improvement.

"The smelter is, as you know, situated with a deep water frontage on a calm land-locked bay, where the largest ocean steamers can discharge with safety, while spurs from the main line of the Esquimalt & Nanaimo Railway bring ores from the Vancouver Island mines. The Tyee smelter is also the most northerly smelter in British Columbia, and is right in the track of the northern shipping that passes through the sheltered waters of the East Coast on its way south.

"It is a debatable point whether the position of the Tyee smelter is not the most northerly situation at which ores can be economically treated. Farther north, the arctic winters and the attending difficulties of obtaining labour and fuel are obstacles in the way of cheap work. On the other hand, large ocean steamers are being placed on the various routes as the trade expands, and it is probable that it will be found more economical to move the ores from the various mines to a smelting centre such as Ladysmith, rather than treat them in the far north. I am pleased to say we have given satis-

faction to all the mine-owners who have shipped ores to us, as we make a point of prompt payments and scrupulous care in following their wishes.

"I wish to here record the high esteem in which I hold our smelter manager, Mr. W. J. Watson, who is a man of great ability and energy and is doing everything in his power towards making his department a sound financial success.

"The accountant's work has, as usual, been done by Mr. E. J. Hearn, who has carried out his duties efficiently and well.

"In conclusion, I trust our next twelve months' work will be marked with the success I feel sure we shall attain."

MINE SUPERINTENDENT'S REPORT.

Mr. J. W. Bryant, mine superintendent, reported:

"I beg to submit my report of the work done on the company's properties on Mount Sicker during the year ending April 30, 1907.

"Tyee Mine.

"Main Ore-body.—The richest part—that is, above the 100-ft. level—has been exhausted of ore from the main shaft to the eastern boundary; this includes Nos. 6 and 7 stopes. There is a small tonnage of this high grade ore left close to the surface near the western boundary, but this cannot be mined until all work is abandoned below it, as its removal would let into the mine a large quantity of water during the winter months.

"Below the 100-ft. level, the ore-body comprised of low-grade ore has all been exhausted east of the main shaft, and most of it to the west, which includes Nos. 1 and 2 stopes. This portion of the ore-body, particularly towards the western boundary, has been broken up by horizontal and vertical faults, which make it expensive to mine.

"North Lode.—A considerable amount of development work has been accomplished in prospecting this lode, and a lens of ore has been discovered which is on the same horizon as those found in this lode in the Lenora and Richard III. mines respectively. This lens has proved to be small and irregular both in size and value. The average grade of the ore is much lower than that of the main orebody, and from the conditions met with in the adjoining properties, both to the east and west, I fear that this is one of a series of small lenses connected by long intervals of barren lode.

"Stopes.—The following table gives the particulars of the ore produced by the various stopes, all of which are exhausted, with the exception of No. 1 stope (intermediate level) on the north lode.

	"From Main Lode or Ore Body.	
	100-ft. Level.	165-ft. Level.
	Tons.	Tons.
No. 1 stope	2,812	
" 2 stope	1,905	
" 6 stope	5,142.5	
" 7 stope	6,210	

"From North Lode.

	100-ft. Level.	Intermediate 165-300-ft. Levels.
	Tons.	Tons.
No. 1 stope	27	2,170

"Summary of Production.

	Tons.
From Main lode or orebody	16,069.5
" North lode	2,197
" Development work	620.5
" Surface heaps	2,680
Total	21,567

"Development Work.—More development work has been accomplished this year than in any previous one, as we have carried our developments to a point 435 ft. deeper, and a diamond drill hole has reached a depth 139 ft. below this, making in all 574 ft. deeper.

"The following tables give particulars of the work done and show the nature and distribution of the footage cut during the year:

"Main Lode or Ore Body—

Level.	Raises and			
	Drifts. Ft.	Winzes. Ft.	Cross-cuts. Ft.	Stations. Ft.
A	132	..	..	..
100-ft.	99	22	..	..
165-ft. ....	..	14	10	..
Intermediate .....	..	..	67	..
300-ft. ....	..	60	..	..
"North Lode—				
100-ft.	21	..	109	..
200-ft.	126	..	..	..
Intermediate	172	..	50	..
300-ft. ....	..	50	28	..
"Below 300-ft. level—				
600-ft. ....	..	15	..	..
1,000-ft. ....	..	..	56	..
1,150-ft.	118	..	198	76
1,250-ft.	659	205	263	74
1,450-ft. ....	..	..	..	15

"The main shaft was sunk a further depth of 250 ft.

"The graphitic schists have been proved to be in the form of a syncline, whose trough runs through the Tyee from west to east; the main orebody is in the south arm of these schists, and the north lode is in the north arm. These graphitic schists unite at the 300-ft. level, and below this no pay ore has been found. As will be seen in the table, the greatest amount of work has been done below this level, principally between the 1,000 and 1,450-ft. levels, and, in addition to this, 1,213 ft. of diamond drilling has been done below the 1,000 ft. level.

"The ore met with in the 1,000-ft. level has also been found at the 1,150 and 1,250-ft. levels, but it is in a less concentrated form in the two lower levels than in the 1,000-ft. level. It appears that the schist is very much sheared about the main fault, and this ore occurs in stringers and small lenticles in this shearing plane.

"From the 1,000-ft. level down to the 1,450-ft. level we have everything that is congenial for the occurrence of another orebody similar to that found in the upper levels, with one exception, and that is the absence of the graphitic schists. I see no reason to doubt that the carbonaceous matter in these schists, as in other localities, has played an important part in the deposition of the Tyee orebodies, and after the large amount of development work that has been done in the deep levels, it looks as if the graphitic schists were a necessary accessory for the creation of an orebody in this formation.

"Average Costs of Development Work.

Drifting	1,386 ft. at \$3.14 per ft.
Cross-cutting	781 " 6.08 "
Sinking	455 " 32.64 "
Stations	165.5 " 28.77 "
Raising	160.75 " 12.53 "

"Total Costs per Ton of Ore Produced.

Stoping	\$1.523 per ton.
Surface heaps	0.030 "
Ore-dressing	0.043 "
Development	1.074 "
Fuel	0.064 "
Retimbering	0.041 "
Freight and hauling	0.075 "
Transport to railway	0.142 "
Pumping (Mine)	0.102 "
" (River)	0.123 "
General charges	0.337 "

\$3.554

"These costs are higher than those of the previous twelve months owing to the lesser tonnage shipped, but principally to the greater amount of development work incurred. This development work has also caused a considerable increase in the mine pumping plant.

"Tonnage Delivered to the Smelter.—The total amount of ore shipped to the smelter during the year was 21,567 tons, with an average assay value of copper 3.471 per cent., silver 2.594 oz., gold 0.127 oz. This brings the total tonnage of the mine has produced to 165,883 tons, and the assay returned to copper 14,715,336 lb., silver 465,466 oz., gold 24,013 oz.

"Aerial Tramway.—This has worked very economically throughout the year; the ropes are wearing remarkably evenly, and there are no signs as yet of any part being worn sufficiently to warrant their replacement by new ones. But this even wear will entail a large outlay in new ropes within a short space of time when once a sign of weakness occurs.

"X. L. Mine.

"The shaft has been sunk a further distance of 202 ft., and drifts have been driven along the line of fault at the 450 and 550-ft. levels respectively. Cross-cutting has been done at both levels. So far no pay ore has been met with, but seeing that the graphitic schists have occurred in the selvage of the fault from the 350-ft. level down to the 550-ft. level, with occasional stringers of copper pyrites, it is possible an ore-body may exist at a greater depth near this fault plane. A considerable quantity of water was met with in the bottom of the mine, which necessitated the installing of an additional pump; it also caused drifts to cave, and, in consequence, they were close timbered.

"The amount of footage cut and costs per foot were as follows:

Sinking	202 ft. at \$29.57 per ft.
Drifting	1,661 " " 10.85 "
Cross-cutting	166 " " 12.84 "

"Doubtful Mineral Claim.—The graphitic schists discovered on this claim were further examined by deeper trenching, and traces of copper were found in this schist.

"On the northern boundary line of this claim a gossan outcrop was developed by trenching and tunnelling. It exposed the existence of a quartz vein containing copper pyrites, but not of sufficient quantity so far to make it of any commercial value. From the strike and position of this vein I am of the opinion that it is the continuation of the caunter vein found in the Tony mineral claim.

"Tony Mineral Claim.—The vein of quartz containing copper was thoroughly examined by diamond drill boring, which proved it to be a narrow caunter vein too small to be of value.

"Thelma Mineral Claim.—Diamond drilling proved the continuation of the graphitic schists met with in the Doubtful claim, but no ore was discovered.

"Diamond Drilling.

"This has had a severe test during the last twelve months, for over 50 per cent. of the holes bored have been horizontally, or at a slightly inclined angle. The small drill has bored holes both at surface and in the mine. The large drill completed one hole to a depth of 2,008 ft., which cut across the lode formation below the deepest workings in the Tyee mine. It has now reached a depth of 1,775 ft. in a hole inclined 15 deg. from the horizontal, which is cross-cutting the X. L. and Doubtful claims from north to south.

"The small drill bored 2,664 ft. at \$2.07 per ft.; large drill bored 3,372 ft. at \$3.42 per ft. A total of 6,036 ft. was drilled at a cost of \$2.83 per ft.

"Machinery and Plant.

"Mine Pumps.—Five extra pumps were obtained to cope with the increase of water met with in sinking the Tyee and X. L. mines during the year; also considerable renewals have been made to parts of the old pumps owing to corrosion caused by the mine water.

"Surface Maintenance.—The surface of the property has been generally cleaned up, stream and water pipes being recovered and buildings repaired. An ore bin and tramway have been built to facilitate the transportation of the Richard III. ore.

"Hoist and Headgear.—Owing to the rotting of the wood foundations on which the hoist stands, a considerable amount

The headgear was strengthened to enable the development of the 1,250-ft. level to be accomplished.

"The remainder of the machinery has worked satisfactorily. During the year the engine has been kept to the top of the mine to its utmost capacity, and did good duty considering the conditions under which it was operated.

"In conclusion, I may say that the main orebody is practically worked out, and now the principal portion of the ore produced comes from the north lode, which has hitherto proved so precarious that future shipments will be very uncertain."

Mr. W. J. Watson, smelter manager, reported:

"Herewith I beg to submit the fifth annual report, covering the smelting operations for the year ending April 30, 1907.

"Ore Receipts.—The receipts of ore for the year were as follows:

	Wet Weight. Tons.	Moisture. Per cent.	Dry Weight. Tons.
Tyee ore	21,544.160	2.1	21,091.836
(Of which 1.32 per cent. was made into bricks.)			
Custom ore			11,401.561

Total ore receipts, dry	32,493.397
Plus—Ore in stock, May 1, 1906.....	3,432 tons
Less— " " " 1, 1907.....	5,030 "

Total tons ore smelted, dry

Custom flux ore	
Plus—Flux in stock, May 1, 1906.....	309 tons.
Less— " " " 1, 1907.....	154 "

Total tons flux smelted, dry.....

"The Tyee ore assayed as follows:—

Copper (assay)	3.51	per cent.
Silver	2.53	oz.
Gold	0.129	"
Iron	10.11	per cent.
Zinc	7.18	"
Silica	23.64	"
Barium sulphate	31.81	"
Lime	2.8	"
Alumina	6.33	"
Magnesium oxide	Trace	
Sulphur in sulphides	13.85	

"Roasting.—During the early part of the year we roasted 6,722 tons of Tyee ore; latterly, however, the ore has been delivered to the furnace just as received from the mine and therefore no roasting, screening or brickmaking has been necessary. This is entirely due to the fact that the custom ores we have been receiving carry considerably less sulphur than the Tyee ore and in consequence the necessity for roasting has been done away with.

"Smelting.—The furnace has been in blast during the year 153 2-3 days of 24 hours each, an average of 12.77 days per month, and smelted as follows:—

	Tons.	Per cent.
Tyee roasted ore	6,486.160	= 18.25
Custom ore	11,401.561	= 31.74
Low-grade matte	1,282.445	= 3.60
Flue dust	861.036	= 2.42
Slag and bairings	315.325	= 0.89
Low-grade matte	1,282.445	= 3.60

Total mixture smelted

Coke used 3,475 tons (2,240 lbs.)

"Above shows an average of 201.993 tons of ore and 231.727 tons of mixture smelted per day. The ratio of coke used was 1 ton of coke to 8.91 tons of ore and 1 ton of coke to 10.22 tons of mixture, as against 9.93 tons of ore and 11.52 tons of mixture in the previous year. The concentration was 11 tons of ore into 1 ton of matte. Of the ore smelted it will be noted that 46.46 per cent. of Tyee was smelted raw, 21.78 per cent. being roasted, and 31.76 per cent. of custom ore was smelted raw, a total of 78.22 per cent. smelted raw and 21.78 roasted as against 64.12 per cent. smelted raw and 35.88 per cent. roasted in the previous year. The flue dust produced and resmelted amounted to 2.42 per cent. of the total smelted, this was dampened and fed back into the furnace in such a way that little or none of it was carried back into the chamber. The slag and barrings amounted to 0.89 per cent. of the total smelted.

"An average sample of the coke used contained: Ash, 19.92 per cent.

"Slags.—The average analysis of the slags for the year is as follows:—

Copper	0.3 per cent.
Silver	0.09 oz.
Gold	Trace.
Iron oxide	19.43 per cent.
Silica	33.8 "
Barium oxide	21.15 "
Calcium oxide	9.77 "
Zinc oxide	5.46 "
Alumina	10.00 "
Magnesium oxide	0.16 "

"Flue Dust.—The following is an average analysis of the flue dust:—

Copper	3.05 per cent.
Silver	2.2 oz.
Gold	0.1 "
Iron	12.2 per cent.
Silica	21.41 "
Barium sulphate	13.87 "
Lime	1.7 "
Zinc	8.73 "
Alumina	8.07 "
Magnesium oxide	Trace.
Sulphur in sulphides	6.45 "

"Product.—During the year we shipped 2,815,816 tons of copper matte, containing 2,237,276 lb. of fine copper; 73,127.52 oz. of fine silver, and 3,700.638 oz. of fine gold; total value, less refining charges only, \$556,604.06, and an average matte of copper (dry) 39.72 per cent., silver 25.97 oz., gold 1.314 oz. The yield from Tyee ore was: Copper 3.23 per cent., silver 2.57 oz., gold .137 oz.

"Taken at an approximate average value of 18 cents for copper, 64 cents for silver, and \$20 for gold this is equivalent to a yield of \$16 per ton of Tyee ore smelted.

(N.B.—These figures are not absolute as the final settlements for the later shipments of matte are not to hand.)

"Hot Blast.—The average temperature of the blast for the year was 224 deg. Fahr., and the question now arises, is the benefit derived from this warm blast sufficient to justify the installation of another heating arrangement for the proposed second furnace. The furnace was run on cold blast several times last year but no difference was noticeable either in the quantity of ore smelted, grade of matte made, or percentage of coke used. It is my intention, however, to make a more thorough test as soon as possible.

"Plant.—The additions made to the plant during the year were as follows:—

"A sample bin, capacity 60 tons, steel lined and roofed with corrugated iron was built at the roast yard. In the centre of the receiving bins at the roast yard a space was left, which is now being filled in; this will increase the capacity of these bins by 300 tons. The coke floor has been extended out over the dust chamber for a width of 28 ft. and a length of 117 ft., so that now the cars can be unloaded from both sides, thus lessening the time required to discharge them.

"Water Supply.—The flume which carries the water to the smelter is about to be replaced by a 10-in. wooden pipe. This will give a higher pressure at the works, and will also be more economical, as we shall be able to control the supply. The survey has been made for this pipe line, and the pipe is now on the ground. The work is being done by the Canadian Pacific Railway Company, as per contract between the Tyee Company and the Esquimalt & Nanaimo Railway, which latter they have recently acquired.

"In conclusion, I would say that the machinery and plant have been kept in thorough repair, and many minor improvements made."

PROFIT AND LOSS ACCOUNT FOR YEAR ENDED APRIL 30, 1907.

Dr.

To Mine Expenses—	£	s.	d.	£	s.	d.
Maintenance, repairs and depreciation of plant buildings and permanent works, aerial tramway, etc.	2,606	17	10			
Live stock account, cost of fodder, etc.	415	14	4			
Wagons	6	5	0			
Timber	1,026	13	8			
Stores	1,016	4	3			
Transport and freight	2,334	13	7			
Hauling	1,010	15	4			
Salaries and wages	10,693	1	10			
Stationery and office supplies	44	4	1			
Telegrams and postages	217	10	6			
Travelling expenses	156	0	0			
Petty expenses	193	3	11			
Prospecting and developing	12,532	10	6			
Insurance	698	0	4			
				32,951	15	2
To Smelter Expenses—						
Maintenance, repairs and depreciation of plant, buildings and permanent works, etc.	2,182	15	7			
Live stock account, cost of fodder, etc.	132	3	6			
Coal and coke	4,683	0	0			
Fluxes	611	13	5			
Timber	119	3	2			
Stores	500	18	2			
Salaries and wages	8,322	6	1			
Stationery and office expenses	32	8	8			
Telegrams and postages	103	2	7			

Travelling expenses	11	12	4			
Advertising	205	11	5			
Petty expenses	196	2	8			
Insurance	492	5	0			
Assay office	581	18	3			
Transport and freight	588	6	4			
Blackmaking	35	1	3			
				18,798	8	5
To London Expenses—						
Office rent	100	0	0			
Petty expenses	118	8	6			
Salaries and wages	724	11	8			
Stationery	94	8	6			
Cables	10	16	0			
Directors' fees	790	4	3			
Legal expenses	12	19	3			
Travelling expenses	68	18	7			
Audit fee	52	10	0			
Assays	6	6	0			
				1,979	2	9
To Revenue taxes paid to British Columbia Government	1,472	1	7			
“ Difference in exchange	442	6	7			
				1,914	8	2
				55,643	14	6
				22,506	7	5
“ Balance to Revenue Account				£78,150	1	11

Cr.

	£	s.	d.	£	s.	d.	£	s.	d.
By Net proceeds of matte sales	110,252	18	10						
Ores on dump and at smelter at cost of labour and mining charges as at May 1, 1906	2,091	7	1						
Less ditto, April 30, 1907	1,006	5	0						
				1,085	2	1			
				109,167	16	9			
				31,218	3	7			
Less purchase of custom ores							77,949	13	2
By Rents				158	15	0			
“ Transfer fees, etc.				20	0	0			
“ Discounts at mine and smelter				21	13	9			
							200	8	9
							£78,150	1	11

REVENUE ACCOUNT, APRIL 30, 1907.

Dr.

1906.				£	s.	d.
July 13, To Dividend at 5 per cent. on £180,000, ordinary shares, as per resolution passed in general meeting held on July 12, 1906				9,000	0	0
1907.						
April 30, “ Amount written off properties and concessions, being 10 per cent. off £62,548 15s. 8d.				6,254	17	8
“ Amount written off plant, buildings and permanent works, etc., at the mine and smelter, being the additions made during the year				3,221	14	11
“ Income tax				2,631	3	0
“ Balance to Balance Sheet				19,341	6	3
				£40,449	1	10

Cr.

	£	s.	d.	£	s.	d.
By Balance as per last account				14,870	3	2
“ Balance from Profit and Loss account				22,506	7	5
“ Interest received on investments	2,917	12	10			
“ Do do deposits	154	18	5			
				3,072	11	3
				£40,449	1	10

(To be concluded next month.)

COMPANY CABLES AND NOTES.

CABLES.

British Columbia—

Le Roi.—July: Shipped from the mine to Northport during the month 8,400 tons ore, containing 2,144 oz. gold, 3,950 oz. silver, and 216,800 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, \$9,500. Expenditure on development work during the month, \$15,000. Owing to collieries being unable at present to furnish sufficient coke, Northport smelter will be temporarily closed down on August 13. Improvement may be expected in a short time with respect to coke supply.

Le Roi No. 2.—July: Josie mine report for month—Shipped 1,800 tons; the net receipts are \$24,422, being payment for 1,935 tons shipped, and \$251, being payment for 23 tons concentrates shipped—in all, \$24,673. Vancouver mine report for month—Shipped 41 tons; the net receipts are \$1,680, being payment for 19 tons concentrates shipped. Some 700 tons ore broken not treated owing to breakdown in mill on July 19; hope to be able to start again almost immediately.

Tyce.—Smelter ran 24 days, treating 1,053 tons of Tyce ore, value (after deducting refining charges) equal to \$8,993; 4,693 tons of custom ore, total 5,746 tons, producing a total of 478 tons of matte.

U. S. A.—

Alaska Mexican.—July: 120-stamp mill ran 28¾ days, crushed 19,987 tons ore; estimated realizable value of bullion, \$31,038. Saved 380 tons sulphurets; estimated realizable value, \$24,662. Working expenses, \$22,919.

Alaska Treadwell.—July: 240-stamp mill ran 28¾ days, 300-stamp mill 28 days, 81,004 tons; estimated realizable value of bullion, \$87,680. Saved 1,538 tons sulphurets; estimated realizable value, \$82,600. Working expenses, \$81,636.

Alaska United.—July: Ready Bullion claim: 120 stamps ran 28½ days, crushed 20,410 tons ore; estimated realizable value of bullion, \$19,496. Saved 326 tons sulphurets; estimated realizable value, \$11,319. Working expenses, \$27,328.

NOTES.

Notice has been gazetted of official approval of the change of the corporate name of the company heretofore known as the Black-Mackay Mining Company, Limited, to that of the Cambrian Mining Company, Limited.

The annual general meeting of the Eva Gold Mines, Limited, will be held at Nelson on October 1.

The seventh ordinary general meeting of the Granby Consolidated Mining, Smelting and Power Company, Limited, will be held at the company's office, New York, on October 1.

MACHINERY AND CONSTRUCTION NOTES.

The Dominion Copper Company has had plans prepared for a two-stand copper converting plant to be installed shortly at its smelting works at Boundary Falls, in the Boundary district.

The second half of a 30-drill Canadian Rand-Corliss air compressor is being installed at the Snowshoe mine of the Consolidated Mining and Smelting Company of Canada, at Phoenix, Boundary district.

W. S. Drewry of Nelson has completed the survey for an aerial tramway to be erected to connect the Hewitt mine with the Wakefield mill in the Silverton section of Slocan district.

The Canadian Rand Company has shipped a small air compressor to the Parkdale Coal Company at Edmonton, Alberta.

Several new concentrating tables have lately been installed at the Consolidated Mining and Smelting Company of Canada's St. Eugene mill at Moyie, East Kootenay. An addition has been made to the mill building to house a conveying belt for ore-sorting purposes. More storage bins for ore and a long trestle out to the lake, are also recent improvements here. The latter is to allow of waste being trammed out and dumped into the lake.

The mine buildings and plant have been removed from the old upper camp of the Rambler-Cariboo Mines, Ltd., in

Slocan district, down to the new camp near the portal of the long deep-level tunnel now the main working of the mine. A large steam boiler, part of the old air compressor plant, has been shipped to Ainsworth for use at the Krao mine in the latter camp.

An electric motor of 125 h.p. to drive a 7-drill air compressor, hoist, etc., has been received at the Crescent mine, between Greenwood and Phoenix.

Peacock Brothers, engineers, Montreal, agents for Walker Brothers, Wigan, England, Quebec, have sold to the Pacific Coal Company, for installation at the newly opened coal mine at Hosmer, Crow's Nest Pass, one of the latter firm's 20x7 ft. 6 in. ventilating fans, to be rope-driven, and fitted with patent anti-vibration shutter. A similar fan, complete with tandem compound condensing engine, rope-driven, for 200,000 ft. of free air per min. at 3-in. water gauge, beside the two compressing engines mentioned last month, have also been sold by Peacock Brothers to the Crow's Nest Pass Coal Company. While these are the first of Walker's air compressors and ventilating fans sold for use in British Columbia, the manufacturers have made the largest installations of this class of machinery in the Dominion—at the Dominion Coal Company's collieries at Sydney, C.B., and at other mines.

TRADE NOTES AND CATALOGUES.

In the suit of the Westinghouse Electric and Manufacturing Company vs. Wagner Electric Manufacturing Company, of St. Louis, Mo., U.S.A., on Westinghouse oil-cooled transformer patent No. 366,362, damages amounting to \$132,433.35 were awarded to the Westinghouse Company.

The Fried. Krupp company, of Magdeburg-Buckau, Germany, advertise in this issue their ball mills for wet and dry crushing, these being a specialty with these manufacturers. The advantages claimed for these mills, which are in regular use in British Columbia at the Vancouver Portland Cement Company's works at Tod Inlet, Vancouver Island, are briefly stated in the advertisement. Jas. W. Pyke & Co., of Montreal, Quebec, are the Krupp company's sole representatives in Canada.

Mussens Limited, of Montreal, Quebec, Canadian sales agents for (among numerous other manufacturers of machinery) the Vulcan Iron Works of Wilkes-Barre, Pennsylvania, send a long list of well-known contractors using the locomotives built by the Vulcan Iron Works. This list shows that these locomotives are in use over a wide area of country.

The August number of the *Machinery Buyers Magazine*, published by The Morse Brothers Machinery and Supply Company, of Denver, Colorado, has been received. Considerable space is devoted to outlines of some of the more recent metallurgical processes and descriptions of new machinery and appliances. Among others is a short description of the Wild Mill, which is coming into favour in the United States and Old Mexico because of its simplicity and ease of operation.

The Westinghouse Electric and Manufacturing Company, of Pittsburgh, Pa., U.S.A., in its "Industrial Series No. 13101," gives an illustrated description of the electrical equipment of the Erie railroad shops at Hornell (Hornellsville), New York. This shows that while the operation of machine tools by electric motors has an exceedingly wide field, no class of manufacturing establishments exemplifies the adaptability of the electric drive more than railroad shops.

R. P. Williams, British Columbia representative of the Canadian Rand Company, Ltd., Montreal, and the Jenckes Machine Company, Ltd., Sherbrooke, Quebec, has gone east to confer with his principals relative to the more expeditious delivery to western purchasers of machinery ordered through him, he having recently made extensive sales of modern plant to both coal and metal mining companies.

Coal has been discovered in the north bank of the Saskatchewan River about five miles from Prince Albert, Saskatchewan.

COAL MINING NOTES.

The Hilest coal mine, near Frank, southwest Alberta, again being worked after having been idle for about two months.

The Western Coal and Oil Company reports that at its Chipman Creek mine in western Alberta it has 7 ft. of clean coal in the face of the tunnel.

The output of the Western Fuel Company's coal mines at Nanaimo for August is stated to have been nearly 50,000 tons of coal.

The *Fernie Free Press* states that a contract has been let for the erection at Hosmer, Crow's Nest Pass, of 240 coke ovens for the Pacific Coal Company. Work on these is to be proceeded with as soon as the requisite material shall be delivered on the ground.

Satisfactory reports of progress at the local coal mines have been received from Nicola Valley. The Nicola Coal and Coke Company is steadily increasing its output and the Diamond Vale Coal and Iron Mines, Ltd., continues to push on with its work of development.

From the Nanaimo *Herald* it is learned that on August 28 the largest production of coal for one day from No. 1 and Northfield (Brehin) mines, since these came under the control of the Western Fuel Company was reached, when 2,079 tons were taken from the two mines.

The Canadian-American Coal and Coke Company, operating at Frank, southwest Alberta, is making satisfactory progress in developing its new seam of coal. Prospecting work to locate the east seam on the surface is also being carried on with the object of opening that seam from the outside instead of cross-cutting for it from the main gangway.

At a meeting of the men employed underground in the Western Fuel Company's No. 1 and Brehin coal mines in the Nanaimo district of Vancouver Island, held on August 24, a committee of five—three representing No. 1 and two Brehin mine—was elected to arrange a new agreement with the company to replace that now existing and which will expire on September 30.

Articles of incorporation have been filed for the Alberta Southern Coal & Coke Co., with a capital stock of \$2,000,000. The trustees are G. H. Scott, Fernie, B.C.; Harry J. Mathewson, Blairmore, Alta.; and H. H. Wright, W. O. Applequist and E. M. Applequist, Spokane, Washington, U.S.A. Most of the property of this company is situated on the south fork of Old Man River, southwest Alberta.

The West Canadian Collieries, Ltd., has completed its new power plant at Lille, southwest Alberta, and has started the air haulage which replaces horse haulage in the mine. The work of putting down the slope at No. 1 is also finished and a new hoist is being installed. It is expected that the hoist will be in and the slope working during September.

The Kamloops *Standard* states that "a sample of the coal from the recent strike near Granite Creek, in the northern part of Similkameen district, has been received by Gold Commissioner Tunstall, as well as a sample of the coke made from it. The coal is a good quality of bituminous, very compact and bright and showing no signs of sulphur. The coke is dense and clean and of exceptional quality. Mr. Tunstall informs us that the seam is reported to be from 7 to 9 ft. in width."

On August 12 between 80 and 100—drivers, shift men, and grippers—employed by Alberta Railway and Irrigation Company at its Galt coal mines, near Lethbridge, Alberta, refused to go to work, owing to a dispute over the interpretation of Clause 1 of the agreement signed June 4 last, which reads: "All miners, and mine labourers, shall work eight hours per day, it being definitely understood that this means eight hours work at their working place, exclusive of half hour for noon time, with the exception of miners working by contract, who are to work eight hours at their working place." The men afterwards returned to work pending an investigation into the merits of the dispute.

Donald G. Forbes has returned to Victoria from Bear Creek, Similkameen.

Hon. Wm. Templeman, Dominion minister of mines, is spending a month or two on the Pacific coast.

C. F. Caldwell of Kaslo, is opening up a promising copper property in Whitehorse camp, Yukon Territory.

E. Hodgson is engineer in charge of coal boring operations on Malcolm Island in Nanaimo mining division.

Lemuel Martin, manager of the White Star coal mine, has been found dead in his bed at Edmonton, Alberta.

W. Yolen Williams of Spokane, Washington, has been looking over mining properties in Kamloops camp.

E. H. Nettleton is manager of the Kootenay Belle mine at Salmo, in the southern part of Nelson mining division.

Prof. John D. Irving of Lehigh University, South Bethlehem, Pennsylvania, U.S.A., is at present in Alaska.

Herman C. Bellinger was in Butte, Montana, lately after having been in Nevada and Utah for about six months.

John Rigby is manager of the Rush & Brown mine, situated near the head of Kasaan Bay, Prince of Wales Island, southeast Alaska.

W. M. Brewer has returned from another trip to the North. While away this time he went into the Copper River country, Alaska.

Professor Arthur Lakes of Denver, Colorado, U.S.A., has been examining mining property in the Tulameen section of the Similkameen district.

M. S. Davys, one of the best known mine managers in the West Kootenay district, with his family left Nelson last month to reside in England.

Robert Musgrave, general superintendent for the Tigre Mining Company, S.A., of Sonora, Mexico, will spend part of September in Victoria.

Thos. H. Evans has left the Yukon for India, after having spent the spring and summer months looking over the gold-bearing creeks of the Klondike.

Frederick J. Pope of New York recently examined the Big Interior group of mineral claims, situated in Alberni mining division, Vancouver Island.

H. Mortimer Lamb, of Montreal, Quebec, secretary of the Canadian Mining Institute, is in British Columbia on the business of that institution.

Wm. Fleet Robertson, provincial mineralogist, after visiting some mining camps on the west coast of Vancouver Island, went thence to Queen Charlotte Islands.

Einar Lindeman is still on the west coast of Vancouver Island examining iron ore occurrences on which he is to report to the Dominion department of mines.

Col. J. H. Conrad recently left the Windy Arm country for New York and other eastern cities. He is not expected to return to southern Yukon until next spring.

Major R. G. Edwards Leckie, the Cranbrook *Herald* states, is one of the witnesses called in the southeast Kootenay coal and oil lands cases before the court at Cranbrook.

Chas. Emmerson, superintendent of the West Canadian Collieries company's Bellevue mine, near Frank, southwest Alberta, has been injured in a runaway accident.

J. M. Milton, at the head of the Five Fingers coal mining enterprise in Yukon Territory, has returned to Whitehorse after having spent several weeks on the coal property.

Wallace Corbett, representing Butte capitalists, has made an examination of the Maggie mine on the Bonaparte and the Tamarac group in Highland Valley, near Ashcroft.

Byron N. White left Whitehorse, southern Yukon, on August 19, on a visit to his home in Spokane, Washington, U.S.A. He is expected to return north during September.

J. C. Dufresne is superintendent of the Blue Bell mine on Kootenay Lake, opposite Ainsworth, owned by the Canadian Metal Company of which S. S. Fowler of Nelson is general manager.

John C. Gwillim, professor of mining engineering at the School of Mines, Kingston, Ontario, is visiting mining properties on Vancouver Island and neighbouring parts of British Columbia.

T. H. Wilson of London, England, chairman of the Tyee Copper Company, and W. H. Trewartha James of James Bros., engineers, are inspecting the company's properties on Vancouver Island.

Francis A. Thomson, professor of mining and metallurgy at Washington State College, Pullman, Washington, U.S.A., spent part of August in Victoria. He was accompanied by Mrs. Thomson.

Ellis Mallory, who some years ago published an article on the geology, etc., of the Britannia mines in the Howe Sound district, left Los Angeles, California, a few weeks ago to visit British Columbia.

Dr. Geo. W. Maynard of New York has been to the Monitor copper mine on Alberni Canal. He is president of the company which owns this mine, on which it is proposed to shortly resume work.

T. J. Smith, president of the Diamond Vale Coal and Iron Mines, Limited, recently gave a newspaper interviewer in Montreal, Quebec, some interesting information concerning coal mining in the west.

Robert R. Hedley after returning from Atlin proceeded to the Cariboo district to obtain for the Dominion department of mines information relative to gold placer mining properties in that part of the province.

James McGuigan has leased the American Boy mine near Sandon, Slokan district. Formerly this property was managed by his brother, Thos. McGuigan, who was accidentally killed in the mine some time ago.

Herbert Carmichael, provincial assayer, was in Victoria from Alberni, lately for a few days. The field work the provincial bureau of mines is doing in the Alberni district is being directed by Mr. Carmichael.

A. J. McMillan, general manager of the Le Roi Mining Company, went to Fernie at the end of August to ascertain the position in regard to a continued supply of coke for his company's smelter at Northport.

Alfred H. Brooks, geologist in charge of the United States Geological Survey's work in Alaska, was at Whitehorse, southern Yukon, on August 20, whence he proceeded down Yukon River to Alaskan points.

Maurice M. Johnson of Salt Lake City, Utah, U.S.A., who is consulting engineer to the Dominion Copper Company, owning copper mines and smelting works in the Boundary district, spent a day or two in Victoria lately.

W. H. Boyd, one of the Geological Survey topographers who has for several seasons been associated with R. W. Brock in field work in British Columbia, recently proceeded from the Lardeau to the lower Similkameen.

C. E. Sweiberg, manager of the Laborers' Co-Operative Mining Company, lately left Golden for Chicago, Illinois, U.S.A. He is expected to again visit the company's mining property near Golden during the winter.

Dr. A. P. Low, deputy minister of mines for Canada, met Hon. Wm. Templeman, the ministerial head of the department, in Victoria late in August, and afterwards visited several of the chief mining sections of British Columbia.

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M. A. Archer, a director of the Central Iron and Steel Corporation, Birmingham, has arrived from England. It has been announced that he intends to make a trip through the coast province for the purpose of obtaining information on coal and iron supply.

Capt. Harry Johns, for years in charge of the Sunset mine, in the Boundary district, and now superintendent of the British Columbia Copper Company's Napoleon mine, near Marcus, Washington, U.S.A., early in August was seriously ill with heart trouble.

C. M. Henretta, formerly manager of the Canadian-American Coal and Coke Company's colliery at Frank, and afterwards with the Pacific Coal Company at its Bankhead coal mine, recently revisited southwest Alberta, coming from Ohio, where he is now engaged in coal mining.

W. J. Elmendorf, engineer in charge of development at the Arctic Chief copper mine near Whitehorse, Yukon Territory, was in Victoria lately on his way to his home in Spokane, Washington, U.S.A. He intends returning to Whitehorse to remain a few weeks longer before winter shall set in.

R. F. Tolmie, deputy minister of mines for British Columbia, has been deputed by the Government to make enquiries at the smelters in the Boundary and Kootenay districts, and of the Crow's Nest Pass Coal Company at Fernie, and to thereafter make a report to the Government upon the coke shortage question.

Milnor Roberts, manager of the Moonshine mine on Prince of Wales Island, southeast Alaska, met with an accident with painful though not serious consequences. When on Moonshine Mountain he lost his footing and slid down the side of the mountain into a clump of "devil's club." He had to go to Ketchikan for surgical assistance and relief.

W. T. J. C. ... metallurgical works on Broughton Street, Victoria, and later was manager at Chihuahua, Mexico, for the Barranco Copper Company of New York, operating La Purissima mine, is now at El Paso, Mexico, where he is consulting engineer for the Mines Management Syndicate.

John B. Hobson, manager of the big hydraulic placer gold mine at Bullion, Quesnel Forks, has returned from New York. Newspaper reports to the effect that Mr. Hobson was to retire from the management of this property have been contradicted, which is gratifying to his many friends in the West.

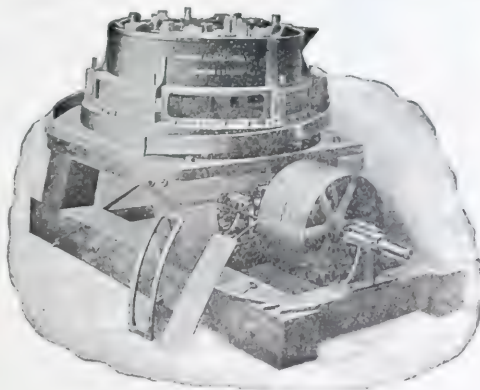
Dr. James Bonar who has been sent from England to Canada to take up the new post of master of the branch mint at Ottawa, is stated to be one of the best known English economists and the author of standard works on Adam Smith and Ricardo; he has, moreover, been head of the English Civil Service Commission, and prominently associated with the Industrial Copartnership and other movements for the amelioration of the condition of the working classes of the United Kingdom.

NOTICES IN THE BRITISH COLUMBIA GAZETTE.

Special Constable H. Des Barres, of Marysville, East Kootenay, to be a deputy mining recorder for the Fort Steele mining division, with sub-recording office at Marysville, in the place of A. A. Ward, resigned.

W. H. Simpson, of Wynton, to be a deputy mining recorder for the Atlin mining division, with sub-recording office at Wynton, in the place of Hugh A. Butler, resigned.

Arthur St. Clare Brindle, of New Denver, to be acting mining recorder for the Slocan mining division, during the absence of Angus McInnes.



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(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

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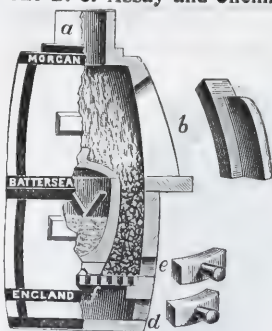
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NOTES AND COMMENTS.

The discovery of five gold near Lake Proulx, Northern Vancouver Island, has been reported.

Mineral exhibits at the Spokane Exposition from Kootenay and Boundary districts will occupy space.

The Kaslo *Kootenayian* states that mining around Sardon, Spadan, is now more active than for years.

The bank houses lately erected at the Billie Hill mine, near Ainsworth, will accommodate 50 men.

The Lake Shore shaft at the St. Eugene mine, East Kootenay, is being deepened to 600 ft.

A few men are kept at work at the Iron Mask mine, Kamloops, pending a test from the district.

The lowest levels of the Queen-Bess mine, Shewan, have been leased and the lessees have commenced work in them.

The V. V. and E. railway has been commenced in Kootenay. Grading there is half completed and is in progress.

From Whistler about 1000 tons of ore from the Johnson & McMillen mine about 8 ft. to 16 inches thick have been discovered.

Considerable quantities of marble are being shipped from the quarry near Kootenay in bulk. The marble is used in building.

Discharge of money made by the St. Eugene mine disbursed a total of \$44,000 as pay on August account.

James Cronin, of Spokane, Washington, is reported to have bonded Dibble and Brewer's mineral claims, situated in the Babine Mountains, Skeena mining district, for \$40,000.

A third instalment of the purchase money for the Queen Victoria mining property near Nelson has been paid to the seller by the Cronin syndicate.

Coke is being obtained from Australia for the Britannia Smelting Company's smelter at Crofton, Vancouver Island. It was found impossible to get sufficient British Columbia coke to keep the works regularly supplied.

In many ways, observes the Cranbrook *Prospector*, the mining industry of southeast Kootenay during the past year has shown vitality and displayed great progress and promise. The outlook for 1908 is exceedingly bright.

A mining class will meet on two evenings a week at Nanaimo during the winter months. The *Herald* says that B. Browitt, who will conduct it, is well qualified to do so as he holds first-class certificates as mine manager for British Columbia, England, and Illinois, U.S.A.

Some bars of silver bullion, from Silver Glimpse ore, reduced by Jas. A. McFarlane, assayer, were among the miscellaneous exhibits at the Kaslo fair. The Silver Glimpse claim is a high-grade silver property.

A cake of gold, value \$3,300, was received in Nelson recently from the Kootenay Belle mine, situated in the Salmo section of Nelson mining division. This was recovered from rather more than 200 tons of ore, which therefore averaged between \$16 and \$17 per ton.

Satisfactory progress at the Cambrian Mining Company's property at Moyie Lake is reported. About 35 ft. of the caisson shaft has been constructed and lowered into the lake. A steam boiler and 4-drill air compressor have been installed and buildings are being erected for the protection of the plant.

The manager of the Fern mine informed the Nelson *Daily News* about the middle of September that he had two carloads of concentrate ready for shipment to a smelter whenever he shall have made suitable arrangements for its treatment. There is plenty of ore in sight, and about 100 tons per week are being put through the 10-stamp mill at the mine.

We have to acknowledge the courtesy of the editor of the *Mining and Scientific Press*, of San Francisco, in acceding to our request for the use of the engraving block showing, on p. 357 of this issue, part of the smelting works of the British Columbia Copper Company, at Greenwood, Boundary district.

On September 14 the Grand Forks *Gazette* said: During the past week the Granby smelter has been

running eight furnaces and making a splendid average of about 3,000 tons a day. This is the first time since the enlargement of the furnaces that the whole battery has been in commission steadily.

The Barkerville correspondent of the Ashcroft *Tunnel* lately wrote: "The air locks in the main tunnel at Slough Creek were closed the second week of September to keep the bulk of the water from the shaft and pumping was discontinued. In the meantime a comprehensive development scheme for this property is under consideration."

The Fernie *Free Press* says: John Brown, manager of the Pacific Coal Company's mines at Hosmer, Crow's Nest Pass, went up the Elk River the first week in September to inspect progress on the new wagon road. Bridges are badly needed on this route and the Provincial Government should do something to assist development in the Upper Elk. It is impossible to get up during high water.

"It is a difficult matter to forecast the fortunes of a mining camp, more particularly an old one, but it is truly believed that Camp McKinney offers as good a prospect as any mining camp in the Province, to give a good return for the investment of capital, provided always that such capital shall be intelligently expended." The foregoing is the opinion of one who knows that camp well.

The Rossland *Miner* appears to be gradually recovering from the insidious malady it has had the misfortune to have suffered from for several weeks, viz., shortage-of-coke hysteria. Now that the Boundary doctors have correctly diagnosed its case and agreed upon "isolation" treatment rather than "arbitration," its own family physician, following his discovery that the disease had not proved nearly so "ketchin'" as he had expected it would, has reviewed its symptoms, changed its medicine, and varied its diet. As a result its early convalescence may be looked for. It is not likely to suffer a relapse until such time as demoralizing conditions shall be general rather than merely local—if they shall ever be.

A correspondent writing from Beaverdell, a mining camp on the west fork of Kettle River, Boundary district, sends the following information: Things are quiet here, but a number of mineral claims on Wallace Mountain are looking well. I have been doing some work on a claim called the Buster, located just above the Rambler, and have a fine showing on it. I had an assay of ore from 8 ft. down in the shift which ran \$153.38. I have sunk 15 ft. and the ledge at that depth has widened to 2 ft. 6 in. The Rambler has shipped five cars of ore, which ranged from \$80 to \$179 per ton. I understand the Sally group looks well and the owners have shipped a lot of ore. The Duncan is looking fine and so is the Kocomo, which is taking out ore.

The *Nelson Daily News* on September 21 published the following: H. Mortimer Lamb, formerly editor of the *B. C. Miner*, Tacoma publisher in Victoria, and now secretary of the Canadian Mining Institute, is making a tour of the Province for the purpose of organizing a British Columbia branch of the Institute. He has been very successful so far in eliciting the support of the mining men of the Province and on January 15 next a general meeting will be held in Nelson at which officers will be elected and papers read.

Says the *Kaslo Kootenay*, "Keep your eye on the Duncan, the scene of the next great mining stampede." The Duncan country is in the northern part of Ainsworth mining division, over the divide from Ferguson camp. It can be reached from the south via Kootenay and Howser Lakes and thence up the Duncan River, or from the north via Arrowhead, Trout Lake City and Ferguson, by train, steamer and stage, and thence by trail. There are known to occur on the Duncan slope many excellent mineral showings, but the absence of wagon roads and other transportation facilities has prevented the development to any considerable extent of the mineral resources of what has long been regarded as one of the most promising mining sections of northern Kootenay.

Newspaper reports indicate that D. R. Young, now of Victoria, well-known in the Kootenay and Boundary districts in connection with questionable mining ventures, has turned his attention to Queen Charlotte Island mining schemes. The *Miner* suggests to all concerned that before putting money into any new mining "proposition" of Mr. Young's they make careful enquiries at Nelson and elsewhere concerning the experience of those who in past years were induced to buy stock in the Similkameen Valley Coal and Ashcroft Smelter schemes, so persistently "boosted" by this man. Then there were the Monashee Mountain and British Empire gold mining failures. May this "word to the wise" be sufficient.

"There has been a deal of dissatisfaction in the past," observes the *Nelson Daily News*, "over the fact that Michel was a closed town, that no lots could be bought therein and that the Crow's Nest Pass Coal Company could, in effect, dictate who should or who should not live and do business there. The Michel townsite having now been placed on the market, this cause of complaint will be removed. But more important in our opinion than the throwing open of the townsite is the fact that the company is apparently prepared to facilitate the securing of homes by its employees. We have always believed that one of the most effective means of securing stable conditions in any industry where large numbers of men are employed is to encourage them to secure homes of their own."

A circular letter has been mailed to members of the Canadian Mining Institute, intimating that those contemplating contributing papers to the Proceedings, should be prepared at the next annual meeting (which will be held during the first week in March, 1908), will greatly oblige the secretary by filling in and returning to him as promptly as possible the form accompanying the letter. It is desirable that the manuscripts of all papers shall reach the secretary not later than December 1, next, to admit of the papers being printed and advance proofs distributed among members for purposes of discussion. No mention is made in the circular under notice of the place of meeting, but it is probable either the ordinary annual meeting or a special meeting will be held in British Columbia next year.

Shipment of ore from the Queen Victoria mine, situated a few miles from Nelson, West Kootenay, has been stopped. N. J. Cavanaugh, resident manager, has been reported by the *Nelson Canadian* to have said: "It is not true that we are closing down the mine. It is true, however, that we have stopped shipping ore, and have let three-fourths of our muckers go. We have six men and are going ahead with development work. I can't say how long it will be before we shall resume shipments. The reason is fairly simple and definite. With the present cost of labour and price of copper there is very little profit in mining. It is only worth while to mine the best ore, and rejection of all the rest involves a waste of labour and values. It is sacrificing a property to operate under the circumstances." The Queen Victoria has since the middle of last winter employed a force varying from 20 to 25 men, and has been, with one brief intermission, a steady shipper to the Trail smelter.

On shipments from Kootenay and Boundary district mines during the week ended September 21, 1907, a total which is the highest on record for those districts. The *Nelson Daily News* publishes particulars; the following are the district totals:

	Tons.
From Boundary district	16,118
" Kootenay district	7,414
" Nelson and Yale	1,100
" Arrowhead and Slocan	200
" Ladreau mines	230
" From Kootenay district	200
	25,062

As the greater part of this comparatively large production was from Boundary mines, it is not expected there will be any considerable reduction in total output until November 1st. On the papers it appears that those mines can produce copper at a profit even with the price as low as at present.

Will the self-constituted authority on Crow's Nest Pass Coal Company matters who last July asserted that "some months ago he was credibly informed that the company would be reorganized and that the passing of the concern into American hands would involve a total change of management," now turn his inventive powers in some other direction. The president, vice-president, and at least two other directors of the company have lately each given a separate and specific denial to newspaper reports to the effect that G. G. S. Lindsey was to be retired from the position of managing director or general manager. And will he now act on his own suggestion and transfer his "slenderous comments" to the one "who openly made the above statement" and "had the courage" to publish what was utterly untrue.

It is not generally known that a few weeks ago there was discovered in the Le Roi mine at Rossland a shoot of ore carrying a higher value in gold than that of the average grade of ore for some time past shipped from the mine. This ore was encountered in a cross-cut from the Black Bear tunnel, on the 300-ft. level. It was regarded at the time as probably important, for the reason that it occurs farther south than any other shoot of ore previously met with in the mine. While not a very large ore body, it has been opened along a distance of about 80 ft. and found to maintain its generally higher grade throughout. A cross-cut is being driven at the 500-ft. level with the object of finding this ore shoot at that depth also. Developments continue to be satisfactory in the deeper workings of the mine. The winze has been deepened from 1,650 ft. to 1,750 ft. and is still in ore. The work of connecting the big main shaft with the winze at the 1,650-ft. level has been completed, the connecting drive being about 280 ft. in length.

We have learned that in the mail lost when the steamer Northwestern was wrecked in the Skeena River a short time ago, was a letter addressed to the MINING RECORD, in which a strong protest was made against the alleged action of the *Bulkley Pioneer*—if that be the correct name of the small newspaper published in the upper Skeena country—in publishing as an editorial such parts of the official report of W. W. Leach of the Geological Survey of Canada as appeared to be favourable to the district and leaving out others not so. This manipulation of an official report our informant took strong exception to. While the newspaper named is by no means alone in doing such a thing, others having set the example in their respective districts, the course taken is none the less reprehensible. However, the person claiming to own the offending publication here complained against probably acted according to his lights. Perhaps they are dim as viewed from the standpoint of those who try to tell the whole truth. If so, it may be that he is to be pitied more than blamed.

We have pleasure in calling attention to the mining enterprise of the Portland Canal Mining and Development Company, Limited, an illustrated description of the property of which is printed on pp. 337-43 of this issue. The company is a local organization, with head office at Duncan's, Vancouver Island, and its directors men of good repute and well known there and in Victoria. In addition, we have been informed, we believe reliably, that the mining property being developed on Glacier Creek is showing up well, in fact is regarded as one of the most promising known in the Portland Canal district. Not infrequently it seems desirable that we warn our readers against company flotations which in themselves, or by reason of evident objections to either the promoters or the property, or both, do not in our judgment merit commendation. In the case of the Portland Canal Mining and Development Company, though, we believe we are justified in taking a favourable view, for we think it is a case where honest men have set about developing a promising prospect into a payable mine. Of course we cannot guarantee they will succeed, but we have no hesitation in expressing the opinion that if they fail it will not be for lack of honest and persistent endeavour. We wish them a full measure of success. Some of the engraving blocks used to illustrate the article under notice have been kindly lent to us by the Provincial Bureau of Mines, the courtesy of whose officials we here acknowledge.

At the Tyee Copper Company's smelter at Ladysmith, Vancouver Island, the furnace was in blast every day throughout August. Whilst we have no official assurance that such was the case, we believe we are correct in stating that this was the first full month's furnace run the company has made. For several years the supply of ore was hardly sufficient to keep the furnace running half of each successive month. Latterly, partly as a result of the company's long persistence in keeping its ore buyer in the field seeking fresh supplies of ore, custom ore receipts have steadily increased until now there is not only ample to keep the furnace continuously in blast, but the matter of installing a second furnace has been receiving the serious consideration of the board of directors. This is an eminently gratifying condition of affairs in connection with the company's smelting business, the more so since it is the direct outcome of years of honourable dealing with, and prompt returns to, those who have sent custom ore to the Tyee smelter, so that full confidence in the officials of the company is general, and of the long-continued policy of keeping in close touch with developments in new mining camps in the Coast districts, particularly those in southeast Alaska. No company seeking custom smelting business north of the International Boundary line is better informed than the

Two, concerning what copper ore deposits have been discovered in northeast Pacific coast districts, and their ore producing capabilities so far as known by developments to date; nor has any other company been so energetic or enterprising in effort to secure whatever smelting business was obtainable on terms that would leave a small margin of profit to the smelter. The company's position is also singularly advantageous in this respect—its smelter stands alone among those of Vancouver Island and Alaska in being assured of a regular supply of coke from the Wellington Colliery Company's ovens on the Island, its fuel supply being provided for under contract. Add to this considerable advantage that of the company's strong position financially, as exhibited by the balance sheet printed elsewhere in this issue of the *Mining Record*, and it will be readily seen that not only are there excellent grounds for satisfaction with the substantial progress it has made in establishing a smelting business mutually advantageous to mine owners and itself, but that it may be reasonably expected its operations will be steadily enlarged and beneficial results be increased to both ore shippers dealing with it and its own shareholders.

The *Mining and Scientific Press* of San Francisco included in the "Special Correspondence" it published on September 14 a letter dated from Vancouver, B.C., the burden of which was the alleged grievance of the coke shortage. As this was the first letter from Vancouver we had seen in that journal this year, we asked ourselves the reason for its appearance and when we detected in it one particular error in figures we had previously seen in the *Roseland Miner* we at once suspected that the "inspiration" which led to its having been written and sent to San Francisco may have been identical with that which so suddenly galvanized the *Roseland* journal into active hostility to the Crow's Nest Pass Coal Company. It is not with this "special correspondence" we wish to now briefly deal, though, but with the comment it apparently prompted the editor of the *Mining and Scientific Press* to make. Now, we have for the editor of that journal a strong personal regard and a high appreciation of his ability. We have never met the gentleman, but as a result of several years' observation of his forceful style and what we have been impelled to believe to be his strict sense of justice, he has been in marked degree an example whom in our humble way, if he will pardon our saying so, we have not hesitated to follow. He will, we have confidence, therefore accept the following comment in the kindly spirit in which it is made. We think the editor of the *Mining and Scientific Press* was misinformed upon certain salient points when, in his editorial criticism, he made it appear that Mr. J. J. Hill of the Great Northern Railway had "got the coking coal of the Northwest under his thumb." Shortly, we may point out that the places in the northwest at which coke-making has been carried on last year and this are Fernie, Michel

(both with Crow's Nest Pass Coal Company's plants), Lillo and Coleman. The latter two are in southwest Alberta, and supply the smelters of the British Columbia Copper and Dominion Copper Companies, neither of which had been obtaining coke from the Crow's Nest Pass Coal Company for a long while prior to the recent trouble. The Great Northern Railway has rail connection with Fernie only, while the Canadian Pacific has with all four places. Again, it is not a fact, as asserted, that "other deposits of coking coal than those now being exploited are not available for the Canadian Pacific Railway or the Government of Canada, because Mr. Hill owns blocks of land commanding access to them." Neither the Dominion Government's coal lands near Morrissey nor the mines the C.P.R. Company's auxiliary organization, the Pacific Coal Company, is opening at Hosmer—not to say anything of C.P.R. coal lands in the upper Elk district now being prospected, and all the coal properties in the eastern foothills of the Rocky Mountains—is inaccessible to the Government or the C.P.R. as stated. On the contrary, there is no insurmountable obstacle we know of to either or both obtaining access to such of these points as are not already reached by the C.P.R. It does not appear necessary to further show that the editorial comments under notice were made under a misapprehension as to the actual facts of the situation. We must, though, here express our emphatic disapproval of the disingenuousness of the *Roseland Miner* in reprinting in its editorial columns, without fair explanatory comment, statements made by the editor of the *Mining and Scientific Press*, albeit in perfect good faith, yet upon incorrect information. It is not inconceivable, though, that occasionally the *Miner* finds out that "when the devil drives needs must."

We regret that we are unable to congratulate Mr. A. C. Flumerfelt on the result of his efforts to obtain for wide publicity valuable information concerning the mining and smelting industries of British Columbia apart from that given in the "Annual Report of the Minister of Mines" for 1906. In that gentleman's announcement of the object he had in view in offering seven prizes of a value of \$50 each for "the most complete answers" regarding the seven stated subjects he had chosen, the following occurred: "Mining and Smelting.—Give a description, by districts of the various coal and mineral areas; an account of the work now proceeding; detail production for 1906; value of same; average number of hands engaged; practical suggestions for developing and increasing this most important industry." On pp. 344-350 of this number of the *Mining Record* we reprint the first prize essay. No information has reached us as to the number of essays there were submitted in this competition, but it seems to us that if there were several others and the one published is the best, the response to Mr. Flumerfelt's invitation to compete was chiefly from those not well

qualified to deal with "this most important industry." It appears also, as if the competition was hardly a fair one, in that it is evident the successful competitor had access to official information that was not available to the public until after the date named for delivering the essays, and which constituted the chief feature of the prize essay. So far as the statistical tables and other official information included in this essay are concerned, they are of course not here subjected to criticism. Most of the information they give was shortly afterwards published as part of the official "Report of the Minister of Mines" for 1906. As to the remainder of the essay, we are of opinion it should have been rejected on account of the inaccuracy of many of its assertions, its faulty literary composition, the want of connection between statements of what are supposed to the facts it sets forth, the sparseness of its information relative to the smelting industry, and the insufficiency of its practical suggestions. It is, we think, a pity the question of determining the merit of the essays on this particular subject was not left to judges well informed as to the accuracy or otherwise of their details. We will give three instances—we could mention a dozen or more—of what we have in mind in making this comment. In the prize essay, under the sub-head "Quesnel Division," it is stated that the Cariboo Gold Mining Company (even the name of the company is wrongly quoted) has at Bullion "ten miles of auriferous channel, a face over 350 ft. high, which has averaged 25 cents per cu. yd." Well, assuming that the value given is intended to be that of the gold-bearing gravel (not that of the channel or the face), we refer our readers to p. J 50 of the "Annual Report of the Minister of Mines" for 1905, where Mr. J. B. Hobson, the manager of the Consolidated Cariboo Hydraulic Mining Company, Limited, is quoted as reporting the results of hydraulicking through seven successive seasons—1899-1905, which show an average value of gold recovered of rather under nine cents per cu. yd. of gravel washed. Again, under the subhead "Omineca Division," it is stated that "anticipation of railway development has resulted in the location of diggings, said to be rich, on the Peace, Pine and Parsnip Rivers." No reliable information of the finding of gold in payable quantities on these rivers has come under our notice, neither have we met anyone who has any. Once more, the ore from the Brown Alaska Company's mine at Maple Bay is described as "a self-fluicous copper"; on the contrary, it is a highly silicious ore, containing chalcopryite—an undesirable ore for smelting purposes where there is not plenty of iron to flux it. Numerous other inaccuracies might be pointed out, but it is not our present purpose to go farther into details. We only repeat, in conclusion, that we regret we cannot congratulate Mr. Flumerfelt on the result of his well-meant efforts; we think he has been decidedly unfortunate in this outcome of his public spiritedness so far as this particular subject is concerned.

GOVERNMENT INTERFERENCE UNNECESSARY.

Smelter Managers Think Proposed Arbitration
Useless.

THE COKE SHORTAGE DIFFICULTY has been solved and the general feeling is that no useful purpose can be served by proceeding with the proposed arbitration, consequently it is thought the Provincial Government will do well to refrain from going on with it. The Vancouver *News-Advertiser* (which, by the way, at once recognized that there was more behind the agitation of a few weeks ago against the Crow's Nest Pass Coal Company than was permitted to be apparent to the general public, and so would not publish the highly coloured despatches sent out from Rossland by the C.P.R. Company's Associated Press organization) had gauged the situation fairly accurately when, on September 12, it published the following editorial comment:

"THE ALLEGED FUEL SHORTAGE.

"Some of the Provincial newspapers are urging the Provincial Government to take immediate steps to regulate the output of coal by the mines in the Crow's Nest Pass district and to impose such restrictions as may be thought desirable. In view of the improved conditions as regards labour and output which are reported, it would seem advisable for the Government to postpone action at the present time. The Government has the report of the deputy minister of mines on the result of his inquiry at the mines and smelters and will doubtless be guided by that. It is certainly not desirable to interfere with the ordinary course of trade without the fullest justification, and a month's delay in taking action will be better than interference by the Government, which may afterwards be found to have been unnecessary."

The temporary difficulty was in regard to the output of coke rather than coal; with this correction the foregoing view of the conditions and the accompanying advice to the Government were, as later experience showed, just what the occasion called for.

Reviewing the position away from the Trail-Rossland "storm centre" it is now evident that the agitation resulting from the "jumping" of district boards of trade and labour unions when the chief manipulators pulled the strings, was quite uncalled for. A canvass of the views of smelter managers showed that those representing the Boundary district smelters were practically of one mind—they had not asked for arbitration and were satisfied that not only was it unnecessary but no good would result from it that would not be gained by waiting a short time so as to allow of the shortage of labour at the coke ovens, and of railway cars carrying the coke to the smelters, being remedied. The general manager of the Le Roi Company, owning the Northport smelter, held similar views. The smaller smelters at Nelson and

Machinery were not affected to so great an extent as the big copper smelters. As to Train and Tull at first wanted arbitration and everything else that would aid in confirming these it regards as its enemies and who need not be named here.

Seeing, then, that a majority of those immediately concerned is not in favour of the Government going farther in the direction hastily demanded by certain organizations (this goes mistaken as to the requirements of the situation, it is hoped that this arbitration movement will be abandoned as unnecessary and futile.

THE VICTORIA EXHIBITION AND THE MINING INDUSTRY.

ON JULY 17 the *Miner* of the MINING RECORD made enquiry, by letter, of the secretary-treasurer of the Provincial Exhibition, arranged to be held at Victoria at the end of September under the auspices of the B. C. Agricultural Association, as follows: "Is it intended to have a rock-drilling contest this year? If so, kindly let me know particulars, so that I may call attention to it in our next issue, 'copy' for which will be prepared within a fortnight. Or if nothing has yet been done in that direction, I shall have pleasure in inviting the attention of those interested with a view to their subscribing money for prizes for rock drilling." No reply was received to this communication. We have purposely deferred calling attention to the lack of ordinary courtesy thus experienced until after the exhibition had been held. Throughout some of the mining sections of the interior it has for years been generally accepted that the City of Victoria's interest in the mining industry, at any rate of the Kootenay and Boundary districts, was largely restricted to considerations of how much of their business it could secure. In view of the frequent claims we have seen made in Victoria daily newspapers to the importance of the mining industry of Vancouver Island and neighbouring parts, we had not looked for such seeming complete indifference to matters in which miners, quarrymen, and others are considerably interested. Further, it would appear as if this seeming indifference extends to everything connected with the mining industry, for notwithstanding that the pretentious name of "Provincial Exhibition" was officially used, an hour's careful search on the part of the editor of the MINING RECORD failed to disclose the inclusion in the varied display made of a single exhibit directly representative of the mining industry, the products of which in 1906 showed a value nearly as large as that of lumbering, agriculture and the fisheries of the Province combined. We remember that in 1903 the managers of the big annual exposition held in Spokane, Washington, in some measure slighted the mining interests, whereupon W. G. Gaunce of Greenwood wrote in such keenly sarcastic terms of that city's particular encouragement of dog fanciers' fads, as compared with

the unquestioned pre-eminence of mining. But the latter has ever since been accorded marked prominence, within the annual rock-drilling contest, as the Spokane Exposition here we give in particular and widespread interest as to have become practically international in character. We can hardly think it possible the management of the Victoria exhibition intentionally took such a position as this: "We have nothing increasing our reputation as the British Columbia show, but shall we hold a 'bronce busting' exhibition every day of our show, we had absolutely no use for such a display of strength and skill as a resource. In a well-known rock-drilling contest. You miners of the Coast and Island Districts may go to Seattle and spend your money there, as do the Yukon and Alaska men; we will not encourage you to come here. And as to exhibits of mining products, why, we know little about such things, and care less." We shall, therefore, not attempt to use the keen weapon Mr. Gaunce used with such good effect at Spokane. We do, though, earnestly submit to those concerned that it is not, in our opinion, a wise policy to so completely ignore the interests and pleasures of those connected with the chief industry of this Province, upon which, in the stated opinion of the writer of the Prize Essay printed elsewhere in this issue, "at least one-fifth of the total population of British Columbia is directly dependent." Further, we think it very probable the offering of a few prizes of fair value for rock-drilling and exhibits of minerals, respectively, together with systematic advertising of these as important parts of the exhibition, (excursion fares to and from Victoria are already customary) would in the course of a year or two result in a sufficient number of people being induced to come from the interior mining districts, as well as those of the Coast, as to make it well worth while giving these matters prominence as features of Victoria's annual exhibition.

The Dominion Geological Survey party in charge of D. D. Cairnes, which was engaged during several months of the current year in Yukon Territory, covers the greater part of the province in geological examining the country along, and lying to the west of, the Lewes River between Whitehorse and Tantalus. The geological survey of about half way between Whitehorse and Tantalus and immediate sections of it. The work accomplished is intended to in some degree show the extent and position of the extensive alluvium and a recent movement the river at Tantalus and extending in a south-westerly direction therefrom. This geological work was curtailed in order that Mr. Cairnes might collect statistical data for the mining branch of the Department, relative chiefly to the Tantalus alluvium, which latter has been completed before Mr. Cairnes left the Yukon for Ottawa.

A CHICKEN THAT CAME HOME TO ROOST.

EXAGGERATION and even positive untruth are by no means unusual in the so-called mining news published in many newspapers. Time and again the MINING RECORD has directed attention to distortions of facts and misstatements made in print relative to mining. It would appear that at least one person who has belittled the efforts of this journal in that direction has discovered that an ugly chicken will sometimes come home to roost.

A press despatch recently sent out from Vancouver was to the effect that a representative of an English syndicate had purchased the West Wellington coal mine, on Vancouver Island, for the sum of \$375,000 and that a company was to be organized with a capital of \$500,000. This story was published in several newspapers, whereupon Wm. Blakemore, who signed his communication in the capacity of "Consulting Engineer to the Company," wrote to the *Colonist* asserting that the report was untrue and that its circulation had already done considerable harm and was calculated to do more. He added: "I should not ask you to publish anything on this subject but for the fact that *nothing so greatly injures mining prospects as the circulation of exaggerated and incorrect statements.*"

While the statement contained in the words we have just now italicised is only in keeping with what the MINING RECORD has for years contended, we call attention to this endorsement of the wisdom of this journal's characteristic and consistent attitude in this matter as having come from a source quite unexpected by us. It is in strong contrast, though, to Mr. Blakemore's earlier attitude, in his paper *The Week*, in a similar connection. We take the following from the MINING RECORD of April, 1906, making only this suggestion—generally there is safety in taking heed to the displays of his "ignorance" by the 'novice' who conducts the MINING RECORD; there may not always be in following the sometimes devious courses of certain pretentious experts. The extract mentioned—which includes the criticism of *The Week* and our comment thereon—follows:

"ANTHRACITE GALORE.

"The *B. C. Mining Record's* unreliability was 'never better illustrated than when it undertook to 'knock' the coal deposits of Queen Charlotte Island on April 28th, and on May 1st it was 'announced that the Western Fuel Co., of 'Nanaimo, had taken an option on one group of claims for the substantial figure of \$700,000. 'This comes of entrusting the conduct of a mining 'journal to a novice, who is either unscrupulous 'or ignorant, or both."

Now, apart from quoting three lines referring to the Graham Island coal from an article contributed by Mr. Blakemore in October, 1904, to *The Engineering and Mining Journal* of New York, the only reference we then made to "the coal deposits of

Queen Charlotte Island" was contained in the following: "But then, in 1904 it suited him (Blakemore) to 'boost' undeveloped coal measures on one of the Queen Charlotte Islands and depreciate the productive coal mines of Vancouver Island." We now ask: Were not the coal measures of the Queen Charlotte Islands correctly described as "undeveloped?" Undoubtedly they were, as is well and widely known.

Further—on Sunday, April 29, the *Nanaimo Herald* reprinted, under the caption: "IF IT WERE ONLY TRUE WHAT A STORY IT WOULD BE," an article to which it referred as follows: "Appended is an article that appeared in the *Vancouver World* on Friday last, on the front page of that truthful (?) journal, under head lines stretched across three columns, thus:

"'ANTHRACITE FOUND IN QUEEN CHARLOTTE IS.
" 'Western Fuel Co., of Nanaimo, Secures Claims
" 'for \$700,000—General Manager to go North to
" 'Initiate Development Work.'"

Then followed the article, which was simply a "fairy" tale, as was conclusively shown in the *Herald's* closing paragraph: "Superintendent Stockett, of the Western Fuel Co., on being shown the article by the *Herald* last evening said: 'It reads well, but there is not a shadow of truth in the story. The party who wrote it must possess a very vivid imagination.'"

It is relevant now to add that although more than a year has passed, nothing has since been heard of "the substantial figure of \$700,000" nor the development work that was to be done.

A Boston journal's comment on the management of the Granby Consolidated Mining, Smelting, and Power Company is to the effect that during the past year ended June 30, last, the company has accomplished two things in particular which are bound to result beneficially to stockholders: closed negotiations whereby the West Kootenay Power and Light Company furnishes it additional electric power, and acquired a financial interest in the Crow's Nest Pass Coal Company, which insures a full supply of fuel. The unfavourable features of the annual report are the higher costs of mining and smelting, but, taking into consideration the fuel difficulty and the higher costs of labour, the company did remarkably well, showing net profits for the year, on a considerably smaller production, of \$1,848,019, against \$1,823,617 in the previous year. From the year's operations share earnings of \$13.68 resulted, while stockholders were paid \$12 in dividends. The balance-sheet for the past fiscal year shows cash and copper on hand on June 30, 1907, amounting to \$853,280, against \$1,023,834 on the preceding corresponding date. The stocks, bonds and bills receivable item increased from \$45,429 in 1906 to \$895,675 this year. If the management finally decides, as intimated in the annual report, to issue \$1,500,000 new stock, it will bring the total outstanding stock up to the full authorized amount of \$15,000,000.

PORTLAND CANAL MINING AND DEVELOPMENT COMPANY, LIMITED.

A Vancouver Island Company Operating in the
Slocan Mining Division of Cassiar District.

PORTLAND CANAL DISTRICT was briefly described in Herbert Carmichael, provincial assayer, in "Bulletin No. 2, 1906," published by the British Columbia Bureau of Mines about the end of last year, and reprinted in the *Mineral Record* for January, 1907, (see pp. 9-13). In order, though, to make more complete the information here given in connection with the properties of the Portland Canal Mining and Development Company:

near, (one) is done in mile. The mountain range, with a few peaks, is almost perpendicular to a ridge of 1,000 ft. Also, miles from the head of the canal, on the east side, is Maple Bay (marked Maple Point on the chart), a small bay affording good shelter but with rather deep anchorage. The two rivers, the Bear and the Salmon, at the head of Portland Canal, are separated by a high bare ridge of mountain that forms the International boundary line, trending off to the west. On the east side of the valley of Bear River a mountain range extends in an east and west direction, the highest peak of the range, Mount Disraeli, being a snow-clad pinnacle 7,000 ft. high. The valley of the river is about a mile wide, composed of gravel and



View our Postcard! Click here to view Maple Hill, which is the setting for the *Conquered* story.

Limited, parts of that bulletin are now again reproduced.

GENERAL DESCRIPTION OF THE DISTRICT.

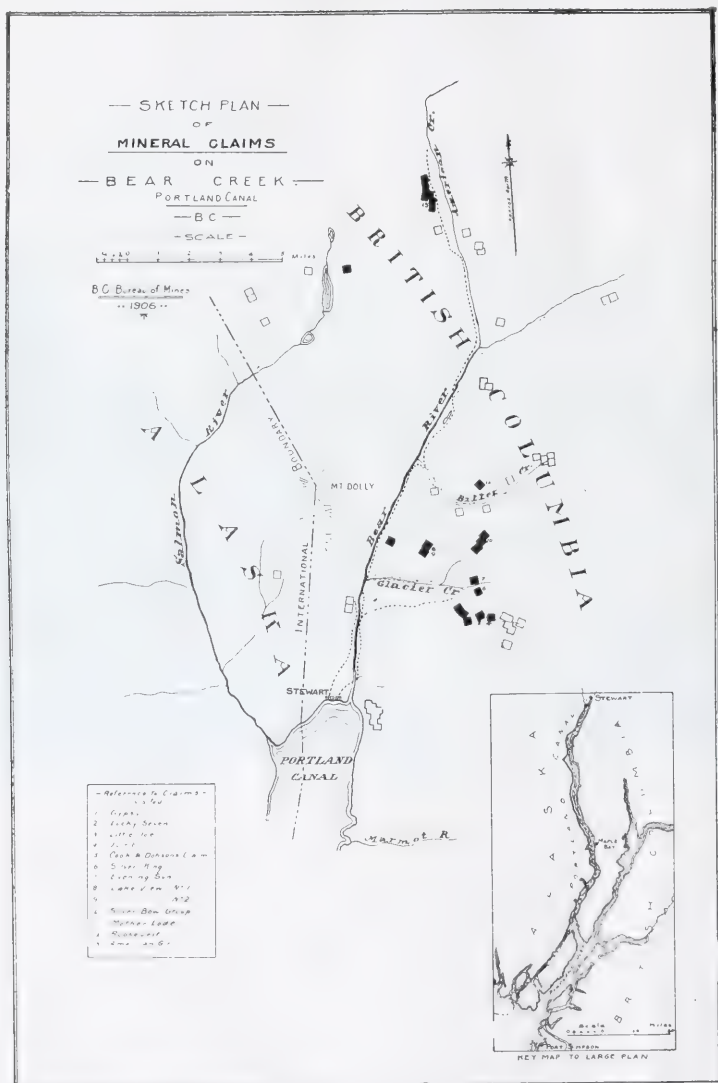
"Portland Canal," said Mr. Carmichael in his report, "is the most northerly inlet on the coast of British Columbia, and forms the boundary between that Province and Alaska. This International boundary, the position of which was definitely decided upon some few years ago, has now, in this portion of it at least, been laid out on the ground, and its position clearly marked by monuments or by a cutting through the forests where such occur. The settlement of this boundary has relieved claim owners of much uncertainty as to which country their claims lie in, and should stimulate a vigorous settlement of both sides of the line. The canal, or fiord, communicates with the open sea at Dixon entrance, and from that point runs nearly due north a distance of 55 miles to its head. It possesses few and indifferent anchor-

sand dotted with cottonwood and alder trees. It extends easterly in a straight line, with a gradual rise, for 10 miles, until an elevation of 400 ft. is attained. From this point the river and creeks rise more rapidly, becoming mountain torrents. With very little work a good wagon road could be made up the valley for 10 miles or more. A bridge over the river, near its mouth, is needed, as, without it, it is nearly impossible to cross the river at high water, and all means of communication are cut off.

*Communication up Portland Canal is maintained by the Union Steamship Company every ten days from Vancouver, and every week by a small steamer from Port Simpson. There is a very comfortable hotel at Stewart, at the head of the canal. Attention is drawn to the fact that the only good road from the head to the source of the Skeena River, Skeena River, is a trail.

divide from Bear River and down the Nass River and struck 'colours,' but no pay placers. Some of the men still believe that if the 'grub' had held out they would have found diggings worth staying with. Two or three of the party wintered on the canal and

The locations there have been made on well-defined veins in a schist country rock, carrying values in silver, gold and lead, with a little copper. Farther up Bear River the country rock is said to change, becoming more granitoid, the change being noted on



staked in the spring of 1899 what is now the Roosevelt claim, on Bitter Creek, while Stewart's claim, on American Creek, was staked in 1902, and the principal claims on Glacier Creek in 1905 and 1906.

"The country round Glacier Creek is the only part which so far has been visited and reported on.

the Mother Lode claim, two and a half miles above Glacier Creek. There is still ample field for further prospecting, and the district is well worthy of attention.

"On the west side of the canal the country rock is granite, which continues from the mouth to its head

and forms the range referred to as between the Salmon and Bear Rivers.

"On the east side a similar granite extends from the mouth nearly to Maple Bay, where the country rock changes to a schist intersected by dykes, which formation continues to a point about seven miles up Bear River valley, where granitic rocks again appear."

THE CLAIMS OF THE PORTLAND CANAL MINING AND DEVELOPMENT COMPANY.

The Portland Canal Mining and Development Company, Limited, was formed to acquire, develop and operate a group of 10 mineral claims situated

downstream, while the country, above a well developed quartz vein averaging about 5 ft. wide, striking N. W. and S. E. and dipping about 20 deg. southerly into the hill. The hanging-wall is schist and the foot-wall porphyritic dyke. The vein shows marked brecciation, the quartz enclosing and cementing large and small pieces of the schist country rock. The vein is well mineralized throughout, the mineralization, however, varying in places, the prevailing ore being galena, pyrites, and silver.

At certain points in the vein lead carbonate replaces the galena. A streak of solid, fine-grained pyrites, from 2 to 14 in. wide, occurs with great persistence



Valley of Bear River about two miles from the Head of Portland Canal, Skeena Mining Division. The Bridge shown has been erected by the Provincial Government across the wide channel of Bear River; it is 1,600 ft. in length, with 20-ft. openings between the Bents. Arrangements have been made to substitute four 60-ft. openings where necessary, to admit of drift wood passing down stream with as little public inconvenience.

on Glacier Creek, a tributary of Bear River which flows into Portland Canal at its head. This group consists of the following claims: Gipsy, Herbert, Extension, Mayflower, Sadie, Mosquito, Barney, Richard II, Lucky Seven, and Little Joe. The distance from the townsite of Stewart, which is at the head of navigation on the canal, is approximately five miles. Mr. Carmichael's report of several of them was as follows:

'Lucky Seven and Little Joe.—These claims are reached by following up the main Bear River trail, 2½ miles from the hotel, where a trail strikes up the south-east slope of Glacier Creek, and rising rapidly until the claims are reached at an altitude of 2,450 ft. and about 1½ miles from the Bear River trail. A short distance above the mine cabin a small creek has exposed a quartz vein; this has been developed on the Little Joe by a tunnel 20 ft. long and a series of shots and open cuts extending through both that claim and the Lucky Seven. The

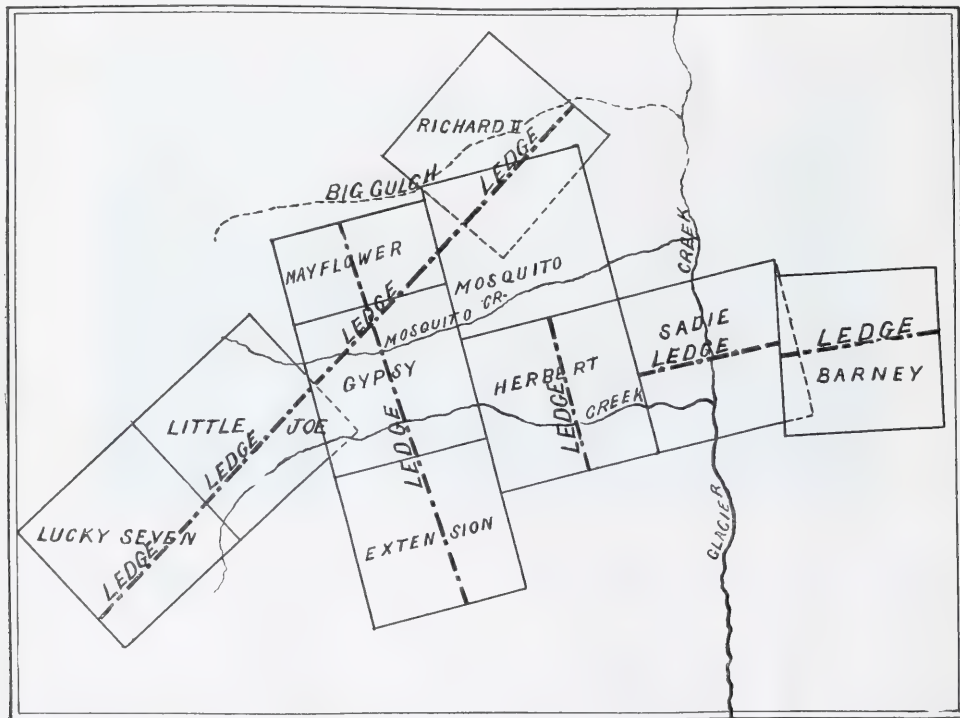
through the lead. This carries about 0.25 oz. of gold per ton. An assay of a fair sample of the ore gave: Gold, 0.1 oz.; silver, 32 oz. per ton; copper, trace; lead, 27.5 per cent.; zinc, 6.3 per cent. The owners state that average ore assays: Gold, \$4; silver, \$14.00; copper, 10¢; lead, 1¢; zinc, 1¢. The vein shows great permanence, having been clearly traced through the Lucky Seven and Little Joe, 1000 ft. across the mountain, and through all of these claims. Another small vein has been located on the claim, but no work has yet been done on it.

'Gipsy.—This claim adjoins the Lucky Seven and Little Joe, farther down the hill, but was not visited, as the shaft was reported partly filled with water. The owners state that they have sunk a shaft 40 ft. deep, and have found a vein of quartz, well mineralized with galena and pyrites, the values, running \$30 to \$40 in gold, 20 oz. per ton in silver, and 20 per cent. lead. The owners intend to sink farther in the spring."

A RECENT REPORT MADE BY THE DIRECTORS.

"The directors of the company on taking over the claims decided to at once start work on the Little Joe, so the president, accompanied by the foreman and four men, together with all necessary tools and supplies, left Vancouver on June 11 for Stewart. On arrival there, the men were set to work cutting a wagon road to the foot of the mountain on which the claims are situated, and the trail over the mountain was improved. Arrangements were made for the conveyance by wagon of the stores, etc., to foot

"The vein, which dips about 20 deg. southerly into the mountain, has been explored on the Little Joe and Lucky Seven by several open cuts and a tunnel about 20 ft. long, all showing good mineralization. It was decided to continue this tunnel for 100 ft., keeping the foot-wall of the vein as that of the tunnel, and thus gaining depth on the vein foot for foot. This tunnel was in, at last report, 96 ft. The result of the work up to date has been highly encouraging, the values increasing greatly with depth. At 45 ft. strong bands of steel galena were encountered, an



Sketch Plan of Mineral Claims on Glacier Creek and Tributaries, owned by the Portland Canal Mining and Development Company, Limited.

of mountain, then additional men were engaged in Stewart and all were employed packing the goods to the mine. A new bunk house was built and the old cabin was used as a cook house.

"An inspection was made of the claims, and the vein on the Little Joe and Lucky Seven was traced right through to the Richard II where the outcrop is as bold and big as on the Little Joe and Lucky Seven, and exhibited similar characteristics, viz., the brecciated quartz, enclosing and cementing pieces of the country rock, as mentioned in British Columbia Bureau of Mines Bulletin, thus proving the vein continuous through six of the company's claims.

assay of which gave: Gold, 0.1 oz., \$2.00; silver, 113.94 oz., \$72.92; lead, 34.8 per cent., \$31; total, \$105.92. At 60 ft. native silver and argentite (silver glance) occurring in a black quartz appeared both above and below the bands of galena, and the last report to the directors states that the whole face of the tunnel 6 ft. 6 in. x 5 ft., was strongly mineralized with native silver, argentite and galena. Assays from this black quartz ore, brought down by a director, gave: Gold, 3.65 oz., \$73.00; silver, 302 oz., \$193.28; total, \$266.28. Brecciated quartz gave: Gold, 0.21 oz., \$4.20; silver, 130 oz., \$83.20; total, \$87.40. Galena and iron pyrites ore gave:

Gold, 0.15 oz., \$1.00; Silver, 23.4 oz., \$10.25; Lead, 32.8 per cent., \$79.27. Total, \$90.52.

"On the Copet mine, which is the richest gold mine in the district, were found a shaft 40 ft. deep,

to 25 ft. depth and then a shaft in the ledge and 440 ft. to the surface of the mine. The shaft was 400 ft. deep. The shaft was sunk and it has 400 ft. of shaft and 40 ft. of ledge in an angle of 75°.



View in Bear River Valley, Portland Canal District, Skeena Mining Division



View on Bear River, about 100 ft. from the Little Joe mine.

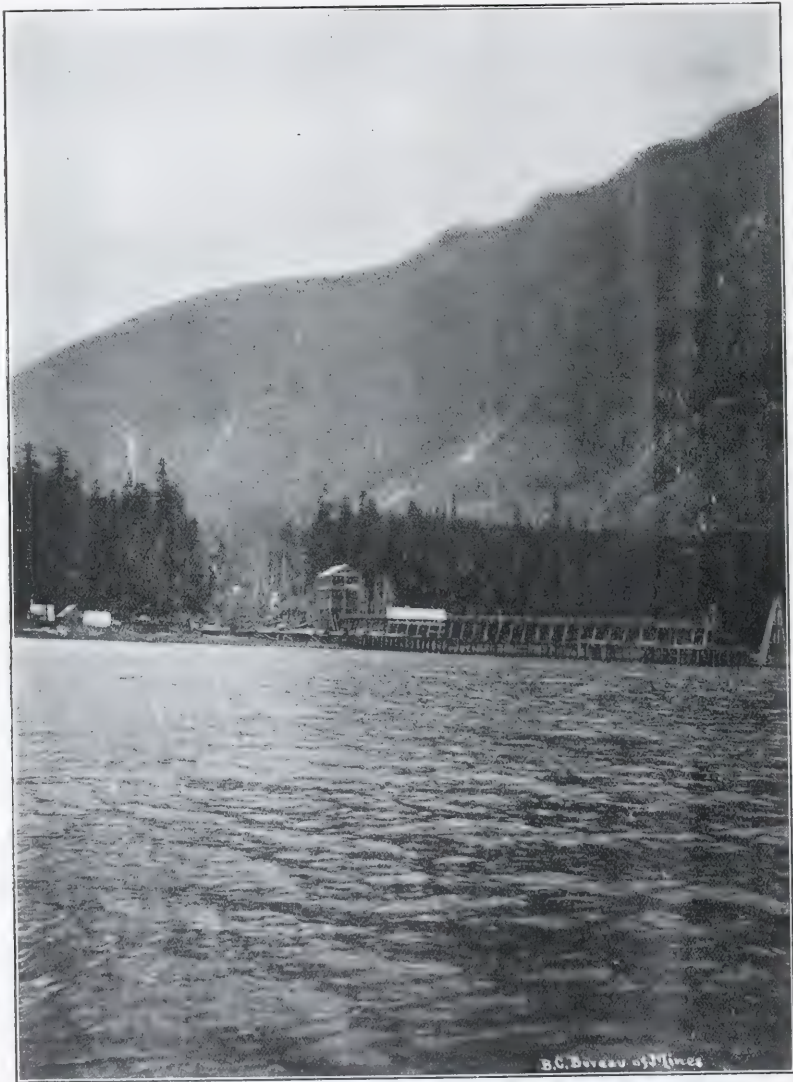
about 28 ft. deep, and as the claim lay on the way to work from the Little Joe mine, it was decided to let a contract for sinking the shaft from 28 ft.

to 40 ft. the mine. At 40 ft. the ledge was discovered and from here, again, a shaft of 2 ft. to 4 ft. of gold grade was found in a depth

of 60 ft. and showing signs of further widening. No samples of this ore yet to hand, they having been mislaid in Stewart.

"A second tunnel has been started on the Little

culty in the way of the transportation of ore by wagon from the foot of the mountain to tide water. From the mines to the foot of the mountain, a distance of about one mile and a half, the ore, if



Lower Terminal of 6,000-ft. Aerial Tramway from the Brown Alaska Company's Outsiders Group Mine to Shipping Place at Maple Bay, Portland Canal. Also showing Ore Bunkers, Wharf, etc.

Joe, lower down the mountain, but not enough work has been done to demonstrate values.

"Now that the Provincial Government has constructed a bridge over Bear River there is no diffi-

shipped, will have to be raw-hided, until tramway facilities shall be provided, which the directors intend doing as soon as sufficient ore shall be blocked out to warrant the expense."

LATEST INFORMATION CONCERNING PORTLAND CANAL.

The latest information from the foreman in charge of development work received at the company's office was to the effect that at the time of writing the tunnel was in 110 ft. and that for the last 45 ft. the ore had carried native silver which showed freely all through the paystreak. The ledge ranges from 7 to 9 ft. in width and the paystreak varies from 1 ft. upwards, the whole face, at present nearly 8 ft. in width, being pay ore.

It is the intention of the directors to have two or three tons of high-grade ore shipped for a bulk test. They are also arranging to have the property examined and reported on by a mining engineer familiar with silver-lead mines, who also will be required to advise them as to the best method of working the mine and treating the ore.

Mr. W. J. Elmendorf, of Spokane, Washington, is being communicated with and he will probably proceed to the property within a month.

GENERAL NOTES.

The main ledge known to occur on the company's property shows on the surface for fully a mile. Its width appears to be about 7 ft. and wherever it has



Near Maple Bay, Portland Canal; looking North.
(Photograph taken two hours after Midnight, June, 1906.)

been cut it is well mineralized. While development has shown the existence of a paystreak of high-grade ore, there is of course much ore that it would not pay to ship, consequently the question of concentration to make this also yield a profit will have to be carefully gone into.

Beside its mining property, the company owns a railway charter which the directors regard as a valuable asset, since it covers the whole of the Bear River and subsidiary valleys. There are known to be many mineral claims of much promise in the mountains surrounding the Bear River basin, and when these shall be developed railway transportation facilities will be required for their profitable working.

The capitalization of the Portland Canal Mining and Development Company, Limited, which has been incorporated in British Columbia, is \$100,000.

There are also \$15,000 non-voting shares, of which 150,000 (known as "Flotation Shares"), are of a par value of 10¢ each, and \$10,000 of 50¢ shares each. The Portland Canal Syndicate, from which eight of the mineral claims were purchased, has been allotted 175,000 of the 25 cent shares, and the remaining 150,000 of this class of shares have been placed in the treasury. Of the 150,000 "Flotation Shares," 105,582 have been sold at par, bringing in to the company \$13,197.75. When the directors' report above quoted from was issued, the expenditure had reached a total of \$11,452.95, leaving a balance of cash in hand of \$1,744.80. All money received by the company is spent on development or payment of balance due on the bond under which the Little Joe and Lucky Seven claims were acquired.

The directors of the company are: T. A. Wood and C. H. Dickie, of Duncans, Vancouver Island; J. H. Hemsworth, of Mt. Sicker; Geo. M. Perdue, Louis Marks, and R. Angus, of Victoria. The company's head office is at Duncans.

Regarding the bond on the Little Joe and Lucky Seven claims the vendor has been paid \$2,000 cash, and there remains to be paid \$6,000 due December 15, 1907, and \$17,000 on December 15, 1908. Payment for the railway charter of the Portland Canal Railway Company is included in the cash and shares the several vendors receive as mentioned above.

The *Mining and Scientific Press*, after mentioning that Alaska in 1906 shipped into the United States \$18,538,702 worth of gold, says further that in the same year "that northern territory took nearly \$4,000,000 worth of iron and steel manufactures, chiefly machinery."

The total pounds of fine copper produced in the United States in 1906, according to a preliminary statement issued by the U. S. Geological Survey, was 906,591,947. Montana was first with 283,485,517 lb., next Arizona with 262,566,103 lb., and then Michigan with 229,695,730 lb. No other state reached a production one-half as large as any one of those above stated, Utah having been nearest with 50,329,119 lb.

Among other large copper companies which are stated to have returned their capitalization since organization are the following: Anaconda of Montana, \$32,000,000 on \$30,000,000 of issued stock; Bismarck & Montana, \$52,000,000 on \$50,000,000; Montana Ore Purchasing, \$9,443,119 on \$2,025,000; Osceola, Consolidated of Michigan, \$6,362,000 on \$2,403,850; Arizona, \$8,982,043 on \$3,775,000; Parrot of Montana, \$6,807,258 on \$2,298,500; Quincy of Michigan, \$17,270,000 on \$3,751,000; United Verde of Arizona, \$22,270,000 on \$3,000,000; Utah Consolidated, \$6,036,000 on \$1,500,000, and Wolverine of Michigan, \$4,530,000 on \$1,500,000.

PRIZE ESSAY ON MINING IN BRITISH COLUMBIA.

By Rosalind Watson Young.

MINING IN BRITISH COLUMBIA was one of several subjects for competitive essays for which A. C. Flumerfelt of Victoria some time since offered prizes of \$50 each for those that should be adjudged the best in their respective sections. That for mining was awarded to Mrs. Young, wife of Dr. H. E. Young, provincial secretary for British Columbia. It is here reprinted in full from the *Vancouver Province*, which published it with others in its special "Land of Opportunity Number" issued on September 21 inst. On another page the *MINING RECORD* briefly comments on the essay, which follows:

1906. \$25,000,000.

Never before did British Columbia reach such a high and valuable record of production. The past year all but touched the \$25,000,000 mark—failing by less than \$20,000. This shows an increase of \$25,000,000 over 1905, and \$6,000,000 over 1904.

Such wonderful strides have been made in copper mining since the industry began in 1894 that one-third of the total production was derived from copper.

The igneous rock which underlies the greater portion of the province affords unmistakable evidence that violent volcanic action disturbed British Columbia in bygone times. To the infiltrating waters which accompanied this disturbance no doubt the deposit of minerals is due. Ore bodies occur along the contact of coast granite from Windy Arm to Similkameen. The Rossland deposits are on the edge of an extinct volcano. And the Phoenix mines, which have raised the copper output to its present large proportions, are impregnations of volcanic tuffs.

The sedimentary rocks are mainly confined to the cretaceous period. In these lie the coal beds of Vancouver Island, Crow's Nest Pass, Nicola, Similkameen, Ashcroft, Kamloops, North Thompson, Peace River, Tooya, Telqua and Queen Charlotte Islands.

The most important minerals may be subdivided into:

Metalliferous—Gold, silver, copper, iron, lead, zinc, platinum and osmiridium.

Non-metalliferous—Coal, coke, building stone, bricks, lime, petroleum, magnesite and mica—the last three only slightly developed.

Of these the most widely distributed is gold, occurring as it does in pre-glacial and post-glacial gravels, and associated in lodes with quartz or copper.

The total production to date of these minerals follows in order of importance:

Gold (placer)	\$ 68,721,103
Gold (lode)	41,015,697
Coal	72,815,423

Copper	35,546,578
Silver	25,586,008
Lead	17,625,739
Coke	6,519,375
Others	5,813,799

Total\$273,643,722

At least one-fifth of the total population of British Columbia is directly dependent upon mining. Reckoning the miners employed at 12,000, if we multiply by three—not five as is ordinarily the case in census-taking, because so many miners are nomadic and unmarried—we have 36,000 people out of a total population of 178,000 depending for their livelihood upon this most important industry.

A description of coal and mineral areas according to districts, and an account of the work now proceeding, follows:

For mining purposes the province is divided into mineral divisions, which are arranged from time to time as circumstances warrant. At present there are 37 such divisions. These we shall group into the well known, though somewhat arbitrarily selected, districts of Cariboo, Cassiar, Coast, Kootenay East, Kootenay West, Lillooet, Yale.

CARIBOO DISTRICT.

Including Omineca, Cariboo and Quesnel divisions. Total output, \$405,400.

The Cariboo goldfields were the first great attraction that British Columbia dangled before the eyes of the world. For almost half a century Cariboo has been contributing towards the placer output of the province, and shows no signs of exhaustion.

As a rule the early miners worked only the shallow deposits to a depth of 30 or 40 ft., and these gravels of post-glacial age were in places exceedingly rich.

In later days it has been discovered by boring that beneath the surface deposits is a stratum of clay, 70 ft. or more thick; and below the clay gold-bearing gravels which must be of pre-glacial origin. To mine these deep gravels is the problem of present-day miners in the neighbourhood of Barkerville.

Quesnel Division.

Production, 1980 oz. gold, \$39,600.

The decreased output of this division is due to the fact that the mine of the Cariboo Gold Mining Company, situated at Bullion, was not operated.

In everything but water supply this property has been well off. It has 10 miles of auriferous channel, a face over 300 ft. high, which has averaged 25 cents per cu. yd., and the south fork of the Quesnel River, near at hand, as a dumping ground. The one thing lacking was water. Though Polley, Bootjack and Morehead Lakes contributed their supply, it was not sufficient in those years when the precipitation was slight.

With a view to increasing the water supply, Spanish Lake has been dammed during the passed year, and a ditch partly excavated for conveying the water, which will be syphoned across the South Fork.

Another important work undertaken at the same time was a rock-shale tunnel, intended to connect the main drift with the surface, in order to procure grade for shipping. The amount of gravel free to bedrock. So, while 1906 has been a year poor in output for the Bullion camp, it has been important in the improvements undertaken.

Work on Kettle, Snake and other creeks was hampered on account of bad weather, although testing was done in the Hardsy.

Cariboo Division.

Production, 17,700 oz. gold, \$155,800.

This is the largest output in five years. The principal producer was the La Fontaine mine of the Cariboo Consolidated Company, situated on Lightning Creek. From 6,828 cu. yd. of gravel, 1,451 oz. of gold, value \$26,697, was derived. Forty-eight men were employed.

At Slough Creek and Willow River attempts have been made for upwards of 15 years to work deep gravels. Millions of dollars have been spent. The supreme difficulty is proper drainage. Whenever "pay" gravel is approached, such an inflow of water occurs as to suspend work. In the past year the Willow River Company is reported to have taken 20 to 30 oz. from a 10-ft. set, and to have closed an option on adjacent property. These things would indicate that the tide has "ebbed" on Willow River. But it is still flowing on Slough Creek, where new machinery is being installed in the endeavour to unwater the mine.

On Williams, China, Cunningham and Grouse Creeks, small companies have worked with satisfactory results.

When the white miners came from California in 1859, Chinese accompanied them; and ever since Cariboo has been their stronghold. Not only do they mine the river bars profitably, but they have their hydraulics, building their own flumes and trestles.

Omineca Division.

Anticipation of railway development has resulted in the location of diggings, said to be rich, on the Peace, Pine and Parsnip Rivers. The year's output was small, amounting to 500 oz., or \$10,000.

CASSIAR DISTRICT.

Including Atlin, Liard, Stikine and Skeena divisions. Output \$555,599.

Atlin Division.

While rotten sluice boxes and old caches indicate that Atlin was not overlooked by the early miner of the seventies, he evidently did not find the rich spots. It was in 1898, during the Klondike excitement, that Atlin became known through the discovery of gold on Pine Creek. Subsequent work has demonstrated that the discovery was made on the richest portion of Pine, where the paystreak extends into the benches for an undetermined distance.

The tributaries of Pine, also, are auriferous. To the north are Birch, Boulder and Ruby; to the south Wright, Otter, Gold Run and Spruce Creeks. Other

important streams are Omineca and Mackenzie. Only a small area has been thoroughly prospected. From a few old claims, traceable gold can be obtained.

Formerly a quantity of auriferous material is decreasing, the output remains about the same, because strong companies occupy the field. Phenomenal values have been seen in the creek, but only streaks of good average value. This cause, together with a heavy overburden and insufficient water supply, tends to cripple output. The same Atlin is possessed of one fine natural reservoir in Surprise Lake, 15 miles long by two-thirds of a mile wide. In 1906 this was dammed, and the water conserved, against the possibility of drought.

While the mineral resources of the Atlin place gold, deposits of copper, lead and gold-bearing quartz have been located. In the rear of the town of Atlin is a unique deposit of hydro-magnesite, snow-white, of an unknown depth, and extending for acres. A sample shipment was marketed in San Francisco, but high freight rates, coupled with excessive moisture, arrested development.

The Pine Creek Power Company operated two pits in 1906 and employed 25 men throughout the season, which lasted from May to the middle of November. The gold occurs in a yellow gravel on serpentine bedrock. The method of mining pursued is to explode bank-blasts of 2,500 to 3,000 lb. of 75 per cent. powder. Tunnels and cross-cuts are run so that the powder is placed every 25 ft. Such a blast so thoroughly disintegrates the gravel that it is easily hydraulicked. Three giants, with 7-in. nozzles, are employed in a pit. Two streams work on the gravel from opposite directions, and the third drives the muddy stream into the sluice. Sometimes a fourth stream is used to trim the tailings pile. The gravel averages 35 cents per cu. yd. Over \$70,000 was recovered.

Adjoining the above company is the steam shovel plant of the Atlin Consolidated Mining Company. The 70-ton Bucyrus 13½-yd. dipper steam shovel began digging in the middle of July. In spite of delays incidental to the newness of the plant, the shovel fulfilled expectations. Trimming and washing facilities were commensurate with the digging capacity of the shovel, a car a minute being delivered into the sluice.

The output of the steam shovel (dipper) worked was 18 ft. The average output 30 cubic yards, or 1,500 cu. yd. was the daily delivery. The returns for the season were approximately \$25,000.

The small company, the Atlin Central, is well adapted for handling Atlin gravel. It has been working for the past year, or 12 months, and is doing a good business.

The company is of considerable interest, because its output is the largest in the world. It is a small company, and its success is due to its operation.

Liard Division.

The principal work done was by the Berry Creek Mining Company, which owns 10 leases, with 15,000 ft. frontage on Thibert Creek. In 150 days this company cleaned up \$63,000. The gold is both coarse and fine. Associated with it is some osmiridium.

A plant has been installed by the Rosella Hydraulic Mining & Development Company on Mc-Dame Creek.

The Liard is almost an unknown region, portions of it never having been traversed by a white man.

Stikine Division.

Assessment work is about all that has been done on any of the claims in the Stikine division. Along the Tooyva River extensive seams of coal outcrop, one seam being 29 ft. thick. These are valueless, however, in their present isolation.

Skeena Division.

Along the Portland Canal there has been keen prospecting, with the result that many promising claims have been located, some of which have reached the shipping stage.

The principal mine is at Maple Bay, the property of the Brown-Alaska Company. Wharf and bunkers are on the beach, to which aerial tramways transmit the ore from the mine. The ore is a self-fluxing copper, and is taken in hulks to the company's smelter at Hadley, Prince of Wales Island. Some 5,390 tons were shipped, 68 men employed.

The Queen Charlotte Islands embrace an archipelago of 150 islands, of which Graham and Moresby are the largest. Although it has been known for 50 years that one of the largest coalfields on the coast is situated near Skidegate, Graham Island, mining has not been successful. The coal is of anthracite variety, and in places is much shattered by dyke intrusions. The isolated position of these islands has retarded development, but the growth of Prince Rupert, with its prospective transcontinental railway and ocean line of steamships, has stimulated interest in Queen Charlotte, so that much staking has been done. In addition to coal, iron, copper and gold occur.

COAST DISTRICT.

Including Victoria, Alberni, Clayoquot, Quatsino, Nanaimo, New Westminster and Bella Coola divisions. Production \$5,388,146.

The excellent showing made by this district is due to the coal mines, and to the Marble Bay, Britannia and Tye.

Though there are indications of coal elsewhere, the chief measures fringe the east side of Vancouver Island. These are divided into the Comox and Nanaimo areas, from which the Pacific coast has been largely supplied for 50 years.

The coal is of high-grade bituminous variety. The seams are 2 to 8 ft. thick, though owing to faults and overthrusts they may thicken to 15 or 20 ft.

The mining of the coal is in the hands of the

Wellington Colliery Company and the Western Fuel Company. The former operates a mine at Cumberland, of which the shipping port is Union, and also the Extension mine near Ladysmith. The latter has its mine at Nanaimo. Shaftheads, wharves and bunkers are located both at Nanaimo and on Protection Island, for the coal seams run under Nanaimo harbour. Mining is carried on by pillar-and-stall and by long wall methods. Facilities for loading coal are most modern.

Of the 1,768,627 tons of coal mined at the Island collieries, about half was sold for home consumption and half for export. An ever-increasing market is found in Alaska.

Coke amounting to 22,851 tons was manufactured by the Wellington Colliery Company at Union. Owing to the growth of smelting on Vancouver and Prince of Wales Islands, it seems likely that the coke industry will be extended.

In the Strait of Georgia, opposite the Comox area, lies Texada Island, 40 miles long and five miles wide. Only the northern portion of the island has been prospected, but it is wonderfully rich in base and precious metals.

No mine in British Columbia has a better record to present than the Marble Bay, owned by the Tacoma Steel Company. It has paid its purchase price, \$150,000 worth of development and equipment, and over \$200,000 in dividends. The ore, averaging \$15 per ton, consists of bornite and chalcocite, and occurs associated with zoisite (the colourless hornblende), garnet, actinolite, serpentine and other alteration products. Sinking to the 700-ft. level has proved the ore body continuous. There were mined and treated at the Ladysmith smelter 104,742 tons of ore; 63 men were employed.

About half a mile distant are the Van Anda mines, which might have had as fine a record as the Marble Bay, had there not been mismanagement and over-capitalization. After some idle years, the mines have been reopened. Twenty-five men were engaged at the Cornell, and 100 tons of ore shipped.

On the west side of the island is an enormous deposit of iron—three hills of magnetite, which can be mined by quarrying. Occasional shipments have been made for 25 years to the charcoal iron smelter at Irondale, Washington. Veins of gold-bearing quartz occur, but these seem pockety. There is also a lime-stone quarry, worked by the Tacoma Steel Company; and the limestone is calcined in kilns of which the capacity is 120 bbl. per day.

The Britannia mine on Howe Sound is an immense body of low-grade ore. The holdings comprise seven claims, which aggregate 300 acres and cover 9,000 ft. of ledge on the strike. Width of ore body is 300 to 600 ft. The ore is copper and iron pyrites with silicious gangue, and is worked by tunnelling. The present workings are 3,500 ft. above sea level, and four miles by trail from the beach.

The ore is sorted at the mine into first-class, second-class and waste, then run by aerial tramway

a length of 17,000 ft. to the beach, at a rate of 100 tons per hour. First-class ore is run direct to shaft bins; second-class is crushed and concentrated, then placed in storage bins ready for shipment to the company's smelter at Cobalt. In 1906 88,880 tons of ore were shipped. The men employed equalled 175.

The Crofton smelter, originally built for treating Lenora ore, Mount Sicker, was idle two years prior to its purchase by the Britannia Smelting Company, Limited. After some changes had been made, the chief being the addition of a briquetting plant, the smelter was blown in January 4, 1906. Its present capacity is 500 tons. The plant consists of 18 ore bins, each capable of holding 300 tons, a furnace building containing three furnaces, briquetting and converter buildings, power-house and boiler-rooms, machine shop, assay and business offices. The capacity of the briquetting plant is 60,000 bricks a day, the bricks being made of fines, concentrates and flue dust. The combination of Britannia and Prince of Wales Island ore makes a good smelter mixture.

The Tyee mine, situated on Mount Sicker, has endured trying times in the endeavour to locate its ore body at depth.

The ore is copper and iron pyrites, in a gangue composed of barite, silica and calcite. Schist forms the country rock. There is no doubt that it is due to faulting that the ore body was lost sight of below the 300-ft. level. In expectation of finding it again, the shaft was sunk to the 1,000-ft. level, the zone was barren. Indications, however, improved at 1,000 ft. Stringers of barite, which in upper levels, accompany ore, appeared. So sinking to the 1,200-ft. level is in progress. During this development work ore has been obtained from the hitherto unworked portions of the upper levels to the amount of 23,833 tons. This ore was treated in the company's smelter at Ladysmith, mixed with custom ore from Texada, Alaska and Yukon. It is transmitted from the mine by aerial tramway to the E. & N. Railway, which delivers it at the smelter. The cost of mining and delivering is \$3.19 per ton.

EAST KOOTENAY DISTRICT.

Including Fort Steele, Windermere and Golden divisions. Output \$5,171,024.

The deposits worked to any extent are confined to the Fort Steele division. They are chiefly coal and galena.

The coal beds at the Crow's Nest Pass aggregate 200 ft. in thickness, and extend over an area estimated at 230 sq. miles. Like the Vancouver Island measures, they are cretaceous in age and bituminous in quality.

The Crow's Nest Pass Coal Company operated collieries at Coal Creek, Michel and Morrissey—at the last-mentioned for only part of the year. The coal mined amounted to 720,449 tons, of which about half was sold as coal and half made into coke at the Fernie ovens.

The St. Eugene mine at Moyie is the largest silver-

lead mine in Canada, and the output shipped to the American continent, during the year was 160,877 tons of ore were mined, and 325 men employed. The principal ore is galena. It outcrops on the mountain top, and again is tapped by a shaft sunk at the foot of Marys Lake. Eight miles of underground work have been done. In 1906 this mine was closed, except for small development work that was carried on. The concentrating plant lay rusting. But the bounty on lead accorded by the Dominion stimulated the St. Eugene into activity. Its concentrates are shipped to the Trail smelter, which belongs to the same company—the Consolidated Mining and Smelting Company of Canada.

The Sullivan mine, situated two and one-half miles north of Kimberley, shipped 24,385 tons of galena to the Marysville smelter, which has a daily capacity of 125 tons. Forty-one men were employed. Profits amounted to about \$100,000.

The North Star mine was worked to the comparatively limited extent of 2,824 tons. Twelve men employed.

In addition to coal and galena are the copper deposits of St. Mary's district, iron at Bull River and petroleum in the Flathead.

In the Flathead, 15 seepages are known to exist, and oil indications are visible along the creeks. The oil is of a high grade, and free from sulphur. Roads are being built, and drilling machinery and a portable sawmill are being set up. In boring, care must be taken to avoid the overthrust of Cambrian or cretaceous stratum, which forms a thickness of 5,000 to 6,000 ft.

WEST KOOTENAY DISTRICT.

Including Ainsworth, Slocan, Slocan City, Nelson, Trail Creek, Arrow Lake, Trout Lake, Lardeau and Revelstoke divisions. Output \$4,548,253.

In the Ainsworth camp good progress was made, the output being two and a half times greater than last year. The largest producer was the Blue Bell, which shipped 9,128 tons. Until August shipments were made to the Pilot Bay concentrator. Then these were suspended in contemplation of the erection of a concentrator at the mine. Twenty-nine men were employed.

The Cork mine worked 30 men and shipped 7,970 tons of silver-lead ore.

Mining in the Slocan was inactive. Neither the bounty on lead nor the high market prices of lead and silver sufficed to stimulate the industry when a duty was imposed upon zinc going into the United States.

The ores of the Slocan occur either as galena in a slate formation or as argentiferous quartz veins in a granite formation.

Of the 16 mines shipping over 100 tons of ore the largest producer was the Payne, which shipped 8,650 tons. The Payne, as well as many of the other mines, is successfully worked under the lease system.

A discovery of stibnite, running 65 per cent. antimony, was made. The ore is to be sent to Scotland for treatment.

The Hall Mining and Smelting Company's smelter at Nelson, originally built for the treatment of Slocan ores, in 1906 showed a deficit, though the volume of business transacted had increased. Notwithstanding this, the plant has been improved by the installation of the Huntington-Heberlein process for desulphurizing galena ores. And smelter charges have been reduced from \$15 to \$12 per ton.

In the Lardeau, the Eva produced 9,028 tons of free-milling ore, with which it supplied its 10-stamp mill.

Rossland Camp.

The principal mines on Red Mountain are Le Roi, Le Roi No. 2, Centre Star and War Eagle.

The Le Roi, with a force of 247 men, produced 127,161 tons of ore from the different levels to a depth of 1,350 ft. In February, 1906, the first dividend in five years was declared.

In Le Roi No. 2, a continuous ore-shoot has been proved 1,200 ft. in length. The value of the ore is \$40 per ton, and mining expenses \$4.22 per ton.

The War Eagle, Centre Star and Iron Mask are the property of the Consolidated Mining and Smelting Company of Canada, Limited, which also operates the St. Eugene and lesser mines and the Trail smelter. At the Centre Star the shaft is 1,800 ft. deep. Here a new and powerful hoist has been installed for handling not only the ore of the Centre Star, but also of the War Eagle and Iron Mask. Underground development work aggregates 14 miles. The total production of these mines since 1894 has been 842,684 tons, valued at \$12,831,033. In 1906 they produced 114,853 tons, with a force of 355 men.

The Trail smelter possesses a complete smelting, refining and industrial plant. It consists of six copper furnaces, two lead stacks, a lead refinery, gold and silver refinery, a copper sulphate manufactory and lead pipe works. So the products are pure lead, pig-lead, lead pipe, copperas, antimony and refined gold and silver. Large quantities of lead are shipped to Montreal to be corroded into paint lead of a high order. In 1906, 257,000 tons of ore were smelted.

LILLOOET DISTRICT.

Including Lillooet and Clinton divisions. Output \$20,314.

The output, consisting of 840 oz. of placer gold and 170 oz. lode gold, shows a decrease of \$12,000 over last year. This is accounted for by the cessation of the Iowa-Lillooet Dredging Company, which closed down on account of internal trouble and litigation, and is now in liquidation.

YALE DISTRICT.

Including Grand Forks, Greenwood, Osyoos, Similkameen, Yale, Nicola, Kamloops and Ashcroft divisions. Output \$8,674,710.

Yale district stands first in the province, both in tonnage and values. This success is due to the Boundary, where 1,182,517 tons of ore produced, \$8,593,469.

The Boundary ores usually occur in irregular masses, being impregnations of volcanic rocks by vapours and mineral solutions. The walls are usually ill-defined, except when the ore body is in contact with limestone. Average ores contain about 26 lb. of copper to the ton of rock, and gold and silver values amounting to \$1.50. Of that amount the smelters recover 21 to 23 lb. of copper, and practically all the gold and silver. Diamond drills are largely used in prospecting.

The most powerful companies are the Granby Consolidated Mining, Smelting and Power Company, the British Columbia Copper Company and the Dominion Copper Company. Each of these has its own smelter.

The Granby Company had a most successful year, being enabled to pay a 12 per cent. dividend in four instalments of \$405,000 each. The mines are situated at Phoenix and the smelter at Grand Forks, about 15 miles apart. Two railways, Canadian Pacific and Great Northern, are the ore-carriers. At the mines 801,406 tons of ore were mined and 475 men employed. The principal working shaft, the Victoria, is down 400 ft. The smelter contains eight furnaces, and has a capacity of 2,700 tons per day.

The British Columbia Copper Company works the Mother Lode group of mines in the Deadwood camp. The main working shaft, of four compartments, is 475 ft. deep. From the Mother Lode mine 101,173 tons of ore were mined and 141 men were employed. Value of ore \$4.50 to \$6 per ton. The Emma produced 12,304 tons; thirty men employed. The B. C. and Oro Denoro together produced 10,468 tons; 24 men employed. The smelter of this company is at Greenwood. During the year it has been completely remodelled. The old furnaces were discarded and replaced by three new furnaces, which have a combined capacity for treating about 2,000 tons of ore daily. In the converter building matte is blown into blister copper, 98 per cent. fine. Electric power is derived from Bonnington Falls.

The Dominion Copper Company derives most of its ore from its Phoenix mines—Brooklyn, Stemwinder and Idaho. These contributed 142,970 tons; 155 men employed. It also worked the Rawhide mine in the Wellington camp; output 25,568 tons; men, 45. And the Sunset mine in the Deadwood camp; output 41,112 tons; men, 23. The Boundary Falls smelter, owned by this company, has been improved and its capacity increased to about 1,500 tons. Mines and smelter are run by electricity.

In Nicola, two coal companies were getting their plants in readiness. One of these, the Nicola Valley Coal and Coke Company, is ready for shipping.

DETAIL PRODUCTION.

Total value of production \$24,980,546

Production According to Minerals.

Minerals.	Quantity.	Value.
Copper (lbs.)	42,990,488	\$8,788,566
Gold, placer		948,400
Gold, lode only	224,927	4,630,639
Coal (tons)	1,547,503	1,551,909
Lead (lbs.)	32,408,247	2,667,378
Silver (oz.)	2,990,262	1,897,320
Coke (tons)	499,227	996,135
Other materials		1,000,000

\$24,980,546

Production According to Districts.

Yale	\$8,779,711
Coast	5,388,146
East Kootenay	5,171,924
West Kootenay	4,690,352
Cassiar	555,599
Cariboo	405,400
Lillooet	20,314

\$24,980,546

Number of Men Employed.

Placer Mining (approximate)	4,500
Coal	4,805
Lode	3,983
Smelting	1,400

11,688

Total tonnage, including coal 3,862,948 tons

Approximate Annual Output of One Second-Class Smelter.

	Tons.
Granby	840,000
Trail	207,000
Boundary Falls	218,811
British Columbia Copper Company	121,031
Creston	60,000
Nelson	37,767
Lyons	20,119
Marvella	27,000

Coal and Coke Output.

	Vancouver.	Crow's Nest.	Total.
Coal sold in Canada	531,106	150,793	681,899
Coal exported	448,906	200,863	649,769
Totals	980,072	351,656	1,331,728
Coke sold in Canada	14,547	134,646	149,193
Coke exported	8,304	50,190	58,494
Totals	22,851	184,836	207,687

PRACTICAL SUGGESTIONS FOR DEVELOPMENT AND THE CRASHING WALL PROSPECT.

No one doubts that British Columbia is possessed of valuable mineral deposits; but, to be worth anything, these must be located and developed.

Mines Shipping Over 5,000 tons.

District.	Mining Division.	Name of Mine.	Tons.	Men Employed.
Cassiar	Skeena	Maple Bay	1,200	68
Coast	Nanaimo	Marble Bay	194,747	63
"	Victoria	Tye	7,833	127
"	New Westminster	Britannia	88,880	175
East Kootenay	Fort Steele	Sullivan	24,385	41
"	"	St. Eugene	167,837	335
West Kootenay	Trail	Le Roi	197,301	347
"	"	Le Roi No. 2	39,341	95
"	"	Camp Star, War Eagle	114,830	155
"	Landsdown	Eve	7,950	98
"	Ainsworth	Blue Bell	9,928	39
"	"	Carl	7,970	30
"	Nelson	Le Plateau	8,875	63
"	"	Second Relief	7,000	30
"	"	Queen	7,915	31
"	"	Yale	10,000	76
"	Slocan	Pine	8,000	31
Yale	Grand Forks	Green	801,406	473
"	Greenwood	Rose	76,568	45
"	"	Idaho, Steamwinder and Brooklyn	142,970	155
"	"	Sunset	41,112	23
"	"	Sunshine	6,000	20
"	"	Emine	44,004	30
"	"	Miner's Luck	496,172	141
"	"	One	8,800	31

The success of the mining industry depends, then, upon three factors: Prospectors, capital and labour. Intelligent prospectors are needed to find the outcrops, and capital is required to work them. But before capital will become interested, it must be satisfied not only with the value of the prospect, but that sufficient labour can be obtained.

To advance the mineral industry is tantamount to increasing immigration. For a greater number of people in British Columbia will mean more of those who instinctively take to the mountains and woods, abhorring city life; more provincial wealth to be invested—and there is no capital so desirable; more labourers, and an increased home market.

Constant advertising promotes success in the business world—then why not in British Columbia immigration? No better advertisement can be found than the present flourishing state of the mining industry. But people of other countries cannot know of this unless means are taken to place information before them.

Mining bulletins, pleasingly illustrated, and containing few but striking facts regarding mining, would be as welcome received as the recent fruit bulletin published by the Bureau of Information. Such bulletins should be distributed throughout the mining districts of England, Wales, Scotland and the United States.

A Bonus on Discoveries.

Every encouragement should be given the prospector. His path at best is hard. The Government, even in its own interest, should make things as easy as possible for him.

If a man discovers gold in a creek, under the Placer Act all he may get out of it is one claim, 500 ft. up and down stream. Suppose that creek produces \$500,000 or \$1,000,000, is it not right that the discoverer should receive a certain commission?

Likewise in mineral locations. Under the Mineral Act, if a man makes a discovery he may stake a claim 1,500 ft. square. Those who follow in his steps may have just as much. If the Government would give the discoverer, who by virtue of his discovery gives rise to a new mineral camp, a free claim for making his discovery, such a generous policy would soon have the effect of increasing exploration.

Prospectors may also be encouraged by the cutting of trails and building of roads.

When a discovery giving promise of future stakings is made, the Government should immediately run a traverse along the principal valley or stream, to serve as a base line for subsequent surveys. Thus would much litigation be obviated.

Crown Grants.

According to the Mineral Act, claims upon which \$500 worth of assessment work has been recorded may be Crown-granted, upon payment of \$25. The Crown grant gives an absolute and perpetual title.

As no proviso is contained therein for forfeiture in case of non-development, mining lands may be

cheaply locked up for an indefinite time. Such should not be.

In every Crown grant issued by the Government there should be a provision of forfeiture at the end of five years, unless *bona fide* development had taken place.

Miners commonly make the mistake of holding too many claims. They do a little scratching on them sufficient for assessment purposes, and that is all. Instead, if they would select one or two of the most promising claims and concentrate their energy in developing them, they would stand a better chance of disposing of them to advantage.

It is desirable that more British capital should be introduced. The British Columbia mines boom of 1896 frightened the English market, and time is needed for it to become reassured.

In the meantime, American investors are taking up the likely prospects. Amongst the heaviest of these are the Messrs. Guggenheim and associates, who have unlimited capital at their disposal, and who have invested largely in the Boundary, Cariboo and Atlin. These Americans deal in mining properties on a business—not a speculative—basis. Before making any purchase they send their experts, the keenest of mining engineers, to make an examination of the property. The experts are unhampered in the amount of money they spend in prospecting, and may examine 50 claims before they make a purchase. But when they do buy, they get full value for their money. If the same course were followed by Old Country capitalists there would be few bad investments; and we should hear less of the "wild-cats" of British Columbia.

Economical management has been the source of success of the Granby company. It is absolutely essential if mines are to pay dividends. Especially in the case of foreign companies, there are more men on the payroll than are necessary. Offices are overstocked with friends of directors. Unless all leaks are stopped, mining cannot be expected to succeed.

Over-capitalization has been the millstone round the neck of too many companies. Something should be done to restrict it, and keep the capitalization proportionate to the money invested. There are many properties that would pay interest on the money actually expended, but are losing propositions when stocked at \$4,000,000 or \$5,000,000.

Too often men expect exorbitant interest on their money which is invested in mines, interest far in excess of that with which they would be satisfied in any other line of business.

Railways are much needed in some sections, especially Cariboo, where machinery has to be freighted in at seven cents a pound.

Although there are valuable deposits of iron at Texada, Port Rupert, Barclay and Quatsino Sounds, they have not been worked because there was no home market, and competition with the eastern product at Sault Ste. Marie or Sydney, N. S., was out of the question.

But the federal bounty of \$2.10 per ton on pig iron manufactured from Canadian ore by the process of electrical smelting, and the export duty of \$2 per ton which the British Columbia Government has intimated is its intention to place on crude iron ore, should have a desirable effect.

The further federal bounty of \$1.65 per ton on steel ingots, together with the market for steel rails created by railway development, should lead to the establishment of steel works and rolling mills on the British Columbia coast.

The establishment of a Provincial School of Mines would have a far-reaching effect. A well-equipped institution, presided over by the most clever and practical of mining experts, could do more than anything else towards uplifting the industry and developing an intelligent body of prospectors and mine men.

How could it be brought within reach of miners? By arranging for night classes and short courses. By the Government, mine-owners, labour unions and private individuals offering scholarships throughout the province. These scholarships might be of a moderate cash value, with free tuition at the School of Mines. Not only would successful candidates be enabled to take a course in mining, but the competitors who fell short of the mark would be sufficiently interested to make an effort to continue their studies at their own expense. Many a man would be glad to exchange the Scranton correspondence course, through which he is trying to improve himself, for practical instruction in a British Columbia mining school.

The research work done by the professors in holiday time would be of inestimable advantage. To appreciate this, consider how much was done for the province by the late Dr. G. M. Dawson. Truly he was a pathfinder!

WILD HORSE CREEK, EAST KOOTENAY.

A Pioneer's View of its Gold Production and its Prospects.

EAST KOOTENAY'S GOLD DIGGINGS in past years drew thousands of placer miners from various parts. Fort Steele and the Dewdney Trail were far better known in British Columbia in the days when much gold was being recovered on creeks tributary to the upper Kootenay River than they are today. Various estimates of the gold production of the richest of those creeks—Wild Horse—have been made from time to time, and among them that of the late Robert C. Dore, one of the discoverers of gold on that creek. About three years ago the *Canadian Herald* published a special number in which was printed a sketch of Mr. Dore. From that the following extracts from the account of a long talk with Mr. Dore have been taken:

"I was the first man to put in a hydraulic plant

on Wild Horse Creek. By the time I got to the site of the nickel property, which we have just seen, that the first nozzle ever stirred dirt in British Columbia. The pipe I used was similar to fire engine hose, but it was 6 in. in diameter. It was reinforced on the outside with heavy rope netting, so that it could resist a pressure of 250 lb. to the sq. in. I never worked at such a pressure, but wanted to make sure of my gear. I had it specially made for me at San Francisco, and I need not say it was terribly expensive between the cost of a special style of plant to turn it out and the freight rates of those times. All the same, it paid for itself ten times over.

"By 1870 the gulch had seen its best days. By that date it had ceased to be a poor man's camp, as the shallow gravel had all been worked out. The general appearance of things has not altered much since then.

"Speaking of what amount of gold came out of Wild Horse Creek, I put it at \$15,000,000.

"I had the means of knowing, because I had water rights to sell, and so had inside information of what was really got out. There was a Government duty imposed, but it was evaded in a thousand different ways. The official figures are nowhere near true, nor do they approximate the truth by millions of dollars. I know that men paid duty on probably a tenth of what they got out of the dirt. Many never paid a cent. It was pretty hard for the Government to keep check on the output when the very owners had more than they could do to prevent wholesale robbery from their claims.

"As for the future, all I can say is that I agree entirely with Dave Griffith in saying that there is as much gold in the gulch as ever came out of it. You see around mountains of untouched gravel. There is the Nip-and-Tuck property on the other side of the creek. They have ground enough to keep the creek busy for the next 40 years. They also have the control of all the water rights from Fisher Creek to Brewery Creek. Amongst the owners are Dave Griffith and Mr. Galbraith, of Fort Steele. I have a fair share of untouched ground, too, but nothing like what I had in early days. The Lily May is a splendid property. The quartz in it runs as high as \$3,000 to the ton in free gold.

"I don't know what is the cause of the dry rot, the death in life, which has infested this wonderful country of ours. It must be that the men of the present day haven't the brains of the old times. Those men I knew in the early days. What do they do? If they haven't the muscle to get at the gold, then I'm thinking they haven't the brains either, to persuade people with more pluck and more money that the gold is still here for the digging, delving and hydraulicizing. I tell you, the men of the old times would go in and work the gulch to the bottom in a single year, and get it out."

IN THE MOUNTAINS BETWEEN NICOLA AND HOPE.

A Surveyor's Trip to Coldwater River and Thence to the Fraser.

FROM NICOLA TO HOPE, through the mountains separating the valley of the Fraser River between Hope and Lytton from northwest Similkameen and the Nicola country, travelling is difficult, judging from the official report of a trip made by A. W. Johnson, D.L.S., printed in the lately published "Report of the Surveyor General of Dominion Lands for the year ending June 30, 1906." Mr. Johnson made the trip under notice in the field-work season of 1905—two years ago. The country he then travelled through still remains very much *terra incognita*, though, so information relative to it may be of public interest, especially as the time when it shall be traversed by a railway appears to be drawing near. Whether or not mineral deposits that can be profitably worked will eventually be discovered in it is as yet unknown, but the opening up of the coal measures of the Nicola Valley and the underground prospecting of the copper-gold ore showings in Aspen Grove, Bear Creek, and other mining camps situated eastward from the country explored by Mr. Johnson, now in progress with promising results, suggest the desirability of giving wider publicity to the information contained in his report. In the hope, then, that the following extracts will be found of general interest, they are here reprinted from the official publication above-mentioned.

After narrating his experiences between Lower Nicola and the head of Spius Creek, and thence "to where the line crosses the Coldwater," Mr. Johnson continued:

"The Coldwater is perhaps a 100 ft. wide here, and not as rapid as many British Columbia streams, and I think could be driven without much difficulty at high water. There is a lot of timber in Townships 10 and 9, especially near July Creek, which will be valuable when a railway shall come in. This is a probability in the near future, as the only low pass from Princeton part of the country is down a creek which comes into the Coldwater from the Otter Valley, about on a level with the centre of Township 10. It is proposed to build up the Coldwater into the Coquihalla canyon and so to Hope. By all accounts this is the most feasible route through the mountains. Between the point at which the line crosses the Coldwater and the source of the Coquihalla there are narrow strips of bench land that might be cultivated if a railway be built up the valley, but beyond this there is, in my opinion, no arable land. The Coldwater is very much staked for coal, though mainly in provincial territory.*

"At the headwaters of Spius Creek is a lake nearly two miles long, which I have named Murray Lake, as a man of that name tried to make a home on its shores. There is a large open meadow which looks as though it would grow a great deal of hay, but I believe the snow stays so late in the spring that as a matter of fact nothing grows well. At any rate it has been abandoned, and the cabin is used only by an occasional Indian hunter or trapper.

"The line runs parallel with a range of mountains 6,000 or 7,000 ft. in height, with many rocks and precipices, but at a distance of some three or four miles, so that it is really in the foothills of these mountains and does not rise to a greater altitude than 5,000 ft., until it gets down to Township 5. The hills are not precipitous, but consist of long steep slopes, for the most part covered with scrubby balsam and dense huckleberry undergrowth, though in places there are miles of dead standing trees. A heavy wind would make this country very difficult for a pack train. Both blue and ruffed grouse are numerous, and there are some foolhens. Deer are more plentiful than in any other place I know of in the interior, and had it not been for the law-abiding qualities so well known in a government survey camp we should have had plenty of fresh meat. We were sorely tempted. There are also bears, both black and grizzly, though we did not get better evidence of the latter than through footprints as large as a ham.

"Running south from the Coldwater we came into a country with no trails of any description, and the pack train was dragged through with the line. Fortunately there was at first a large area of dead standing timber with comparatively good footing and not very much undergrowth. We again got into snow, but the summer was so far advanced that we could avoid the deepest of it. The hills get higher and steeper and the timber scrubbier, where there is any, as along the streams, but from the Coldwater to the south fork of the Tulameen, the tops of the hills are nearly all burnt.

"Working down into Townships 8 and 7 we reached the mineral country. In places where one would think no white man had ever been we came across location stakes. Twenty years ago there was quite a boom at Granite Creek, and it was this excitement that produced the Similkameen pack trail connecting the interior with the coast south of the Fraser.

"Every summer there are parties of prospectors out in this district, though I personally saw only one man in four months, and he was on a rock slide a mile away. Most of the mineral is copper in various forms, exploited for the most part around Princeton and Granite Creek, but found in the railway belt too. The only active work in the belt is at Summit City. This has been done on a galena proposition, and is considered rich, but it will take more than my power of demonstration to persuade

*"Provincial territory" as distinguished from Dominion lands within the Railway Belt of British Columbia.—Editor MEXICO RECORD.

the owners that they are not on practical land. They had walked in so often from Hope that they were absolutely certain my work was wrong. Into the impossible to use a theodolite in these mountains anyhow because of the slope.' After that, of course, it was useless to argue.

"Summit City, however, is not as large a place as the name might suggest. In the height of summer its population may be on occasion six men; in winter there is no population whatever, and only a cabin or two and an all-enveloping snow drift mark the spot. Transportation is, of course, what all these places want. Ore that has to be packed on horses 40 miles before shipping must be extraordinarily rich to pay. Wagon roads in the mountains cost almost as much as railways anywhere else, and railway companies regard British Columbia as a huge barrier before their trade with the east, one which must be overcome as cheaply as possible with as few diversions as may be on the way.

"It is not easy to form any definite idea as to the real value of a mineralized country. There is plenty of mineral here on the surface; whether the mineral will be in paying quantities under the surface requires proof, that is to say, capital, and capital appears rather shy of this district. You cannot learn much from ordinary prospectors, because most of them were swinging an axe only a year or two ago, and cannot go much further in their description than the repetition of a few catch names like peacock copper, copper pyrites and quartz ore. When you do meet a mining expert you cannot help thinking of the western description of him in which he figures so prominently in the superlative degree. All mining centres believe that they have a bonanza. One or two out of a thousand have; the others have not; so it is quite possible Summit City is a big thing.

"We get nearer the high mountains all the time as we work south, and after leaving the south fork of the Tulameen the timber is green again and a good deal heavier. On this river we were troubled a great deal by thunder storms. A perfect morning without a cloud, and before night heavy thunder and deluge of rain. Speaking of British Columbia, there is nothing that a surveyor fears so much as rain. If he were in a cleared country rain would make little difference one way or the other as long as he could see through the transit. But in these mountains with their dense undergrowth, a shower of rain means being as wet in ten minutes as if one had been swimming. Note books, watches, and everything else one carries get the same treatment. It is no uncommon thing to see men hanging cheap watches in the sun to dry out after dipping their works in the coal oil can. Some of them bake them in the stove instead of waiting indefinitely for the sun, which is very much surer. And if high up the rain is intensely cold, and is by long odds the greatest hardship here. Nor is it possible to lie off for all wet

days. If it rains there would be no work at all, even when there would be no work done at all.

"We crossed the watershed near the south boundary at Loomahly 3. Runge 25 miles are made the canyon trail. This is from all accounts an easier pack trail than the Similkameen, but is out of repair and very rarely used. This point is on a clearly defined line between upper country and coast climates. On the east are balsam and brule, high steep hills up to 5,000 or 6,000 ft., gradually getting lower towards the Similkameen; on the west, 8,000-ft. mountains with huge precipices, cedar, fir and vine maple in the valleys. More important to us, on the east is feed for the horses anywhere; on the west only in widely scattered swamps or along the shores of small lakes. When we got as far as horse feed lasted, which was on a small pond between Mount Hopeless and Sumas, we moved down to Hope, leaving the tie for next season.

"April, May and June were wetter than I had ever before seen them in this part of the country, but we had fine weather in July, except for the thunder storms already mentioned.

"As an agricultural country the district we traversed must be described as a failure, a very distinct failure. There is not enough timber to warrant its being taken out yet. When the mines shall be working much of it will be used by them, and will be handled by portable mills. On the other hand the climate is bracing and not too wet; the scenery is gorgeous, peak after peak as far as one can see on the west and rounded hills for 60 miles on the east. If this was a Canadian Pacific Railway guide book this district would be called a sportsman's paradise. Never having been in a sportsman's paradise I cannot tell, but deer are numerous, black bear are not uncommon, and grizzly bear can be found also. I have no doubt there are goats in the high rocks, but we were not near enough to come across them. There are plenty of grouse. But it is on minerals that the future will depend."

Bullion and concentrates from ore from the Ymir mine have been sold to a total value of more than £430,000 (about \$2,150,000).

Industrial workers have secured in the Federal mining district in the United and New Wales for a further period of three years by the agreement signed in December by representatives of the coal owners and miners. Under this the men receive 5 per cent. advance in wages from the first making-up day in January. There is a clause in the agreement by which, in the event of the passing into law of the "Mines Eight-hour Bill" by Parliament, either party may terminate the agreement at six months' notice, which is regarded as an indication that in the opinion of both the miners and the coal owners the passage of this bill has become a probable event in the near future.

CAMP McKINNEY MINING NOTES.

CAMP McKINNEY is once again receiving attention and several of its mining properties are being worked. A well-informed correspondent has written to the *MINING RECORD* as follows:

You know what a long time the old camp has been practically deserted, so it was like "a bolt from the blue" when the few faithful ones who had remained with it learned that some Phoenix people had leased the old Cariboo and intended working it. The unwatering of the mine was a long and tedious

The Phoenix people have been enterprising in putting up their money and deserve to meet with success for the pluck they have shown in tackling a hard proposition, handicapped with an iron-clad lease. They have recently also leased the Sailor group and will shortly unwater that property, from which they anticipate payable returns, as the ore body is almost intact and it is well known this claim carries ore of good values.

Some parties have bonded the Le Roi, a claim about four miles east of Camp McKinney, on the hogback between the north and south forks of Rock Creek, and are continuing the sinking of the old shaft



View of 20-stamp Mill at Cariboo McKinney Mine, Camp McKinney.

job, the hoisting machinery was in poor shape and the pumps worse and so months passed before actual mining and milling were fairly started. Still there were troubles ahead, the old 20-stamp mill was all but worn out, but after considerable patching and numerous break downs, 10 stamps were got into fair running order.

Fortunately the lessees engaged the services of a good superintendent (P. Davidson Ahier, some time since manager of the Idaho-Alamo mines, in the Slocan), who thoroughly understands his work and under his supervision matters have been progressing fairly well. The ore in sight is low grade and to be worked at a profit needs a mill of larger capacity, while the immense body of zinc ore is not amenable to thorough treatment without a preliminary roasting; the assays are good, but the gold cannot be saved on the plates.

started by J. Copland, the owner. The surface showing is immense, from which fair assays in copper have been obtained, and should the values increase with depth, a promising camp is likely to result, as the whole mountain is more or less mineralized. Hugh Cameron owns two claims in the vicinity of the Le Roi and an interest in the Dayton, a little to the north, which latter has a surface showing rich in free gold.

Henry Nicholson has been doing some work on the Snowdon, which adjoins the old Victoria claim and has taken out a few tons of good ore. He would like to see the owners of the Victoria do some work on their property; he feels sure it would repay them. A slide last spring exposed a lot of the ore, and as water can be put on the claim at a comparatively small cost, the top stuff could be run off by piping or ground-sluicing and the ore body glory-holed.

SCHEELITE MINING IN NEW ZEALAND.

Example for Owners of Mineral Claim in Cariboo on which Scheelite Occurs.

SCHEELITE was discovered in Cariboo in 1904, but as yet little has been done towards turning that discovery to practical account. *The Mining Journal* of London, England, recently published some information on "Scheelite Mining in New Zealand." In the hope that this will prove useful to those interested in that mineral in British Columbia, it is here reprinted, prefaced by excerpts from the "Annual Report of the Minister of Mines" for the years 1904 and 1906, respectively.

In his report on Cariboo district for 1904, the late Mr. John Bowron, gold commissioner, reported concerning scheelite as follows:

"Mr. Austin J. R. Atkin, who has been associated with Mr. C. J. Seymour Baker, as assayer and metallurgist, in exploiting the quartz veins of the district for the past two seasons, writes me regarding their operations, referring particularly to the discovery of a ledge of scheelite at Hardscrabble Creek, which from present indications bids fair to be of much importance. Mr. Atkin says:—

"The most important find of the season, and one which may prove of great commercial value, was made on Hardscrabble Creek.

"The following account may draw attention to the care which should be exercised in having every unidentified mineral thoroughly examined and its composition determined: In drifting up the channel some years ago for alluvial gold, some pieces of white mineral were occasionally found, and an examination showed them to be barytes. Later on, the white pieces became more numerous, and seemed heavier, until the dumpbox required so much water to keep the riffles clear, that but little of the fine gold was saved. It was noticed that the finest mineral was the heaviest, and was unlike the white substance (barytes) which first caused the trouble. When the situation was at its worst, a change took place in the character of the bedrock, and at the same time the troublesome mineral disappeared, so that no further investigation into its composition took place.

"Some 'black sand' had been put away and the writer was asked how best to clean it, and to explain the circumstance of the white mineral. After separating some of the latter, an examination, since checked many times, showed it to be scheelite, of very good quality. The old workings being still in good condition, an attempt was made to find the deposit from which it came, and very little work exposed the scheelite-bearing zone. This consists of highly altered country rock, the scheelite being scattered through it in small patches, but it is in the quartz stringers that most of the mineral is found. Some of these, varying from one inch to four inches wide, contain about one-third scheelite, with a little galena, and products of decomposition of iron pyrites. This

zone appears to be from 12 to 20 ft. wide, as determined by cross-sections, done up to July, 1904, and gives every promise of proving a valuable deposit. Unfortunately, the country rock has been altered by the infiltration of calcite, until it approaches limestone in hardness, so that, before the lode can be opened up, machinery will have to be installed to concentrate the calcium tungstate.

"A test was made by washing some of the decomposed surface, but the ore had not sufficiently weathered to make this very satisfactory, as when the rock was exposed in Tertiary times, the stream removed the surface as soon as it was at all decomposed. However, sufficient clear scheelite was obtained by this crude method to indicate a concentrating ratio of 1 into 10 (approx.). These concentrates contained about 70 per cent. tungsten trioxide, with very little galena or pyrites. With a ready market, which this mineral commands at present, the outlook for the new find is encouraging.

"There are other deposits of scheelite in the Cariboo schist belt, for the writer has specimens in his possession which are 'float' from other ledges, which further prospecting may discover, although these ledges are not to be looked for in Willow River section."

"A quantity of this scheelite was sent to Mr. E. C. Rollins, of Chicago, to have tests made to determine its value, in response to which a communication was received from Messrs. Cramer and Burt, of 1,114, Monadnock Building, Chicago, stating, 'The scheelite was of good quality, and there was at present a considerable demand for it, at prices varying from \$360 to \$460 per ton, according to quality.' As there is no duty on tungsten ore going into the United States, the discovery of its existence here in large quantities but emphasizes our demand for proper transportation facilities."

In his report for 1906 the gold commissioner for the district quoted Mr. C. J. Seymour Baker, who had earlier been associated with Mr. Atkin in exploiting the quartz veins of the district, as having written: "The deposit on Hardscrabble Creek was visited during the 1906 season. The scheelite appears to be distributed very irregularly in the country rock, which has quartz in lumps and lenses running through it. The quartz often appears to the eye to be richer in scheelite or in tungstic oxide than the country rock, even where it is actually much poorer, as it is difficult to judge of the value of the ore by its appearance. It is doubtful if the scheelite carries any gold or silver, although that near the surface of the bedrock does, but this is believed to be derived from the auriferous alluvial above it."

The following is the article in the *Mining Journal*, above referred to:

"Through the enterprise of Messrs. W. & G. Donaldson, Macraes Flat, Otago, New Zealand, the de-

rapid

progress during the past few years. This is practically a new industry for the colony, which promises to find employment for a large and increasing number of miners in the near future. In developing their Golden Point and Tungsten properties for gold the Messrs. Donaldson came upon extensive deposits of scheelite, and after many experiments and the adoption of the latest appliances for utilizing this mineral are now making regular shipments to Europe, and especially to Germany, where the value of scheelite or tungstic acid is highly appreciated by steel and other manufacturers, and finds a ready market and brings a high price. This firm's exhibit at the recent Christchurch Exhibition, showing the mineral in its various stages of development, created much interest in mining circles. The *Otago Witness* says:

"The history of this industry is interesting, as showing how valuable minerals may lie at the feet of miners and not be recognized, or the means of profitably working them not be known. The occurrence of scheelite in the Macraes district has been known for 25 years or more, and a sample of the ore was shown at the Dunedin Exhibition by Mr. A. B. Kitchener. A year or two afterwards Messrs. Kitchener and Donaldson employed men to take out and hand-dress the ore, and as a result they shipped 6 tons, which was of poor quality—being only 40 per cent. in tungstic acid—and brought a price that just covered expenses. Three-fourths of the stone could be dressed only by machinery, which at that time was not available. At the same time a miner started in another part of the district, and found considerable quantities of very fine ore, but the same difficulty arose. Nothing further was done until, some years later, Messrs. Donaldson, who were working the reef for gold, opened up the lode in a fresh place, and, in doing so, discovered some extremely rich deposits of scheelite. They hand-dressed 6 tons, and, declining £25 (about \$125) per ton for it, shipped on their own account to London, where it realized £60 per ton. Immediately after the sale in London the same parcel was resold in Hamburg for £80 per ton. Anticipating a good price, Messrs. Donaldson made arrangements for special machinery to treat the battery sands for scheelite after they had extracted the gold in the ordinary battery (stamp mill) process. The machinery proved a complete success, and was able to recover the scheelite from the tailings and dress it to 72 per cent. of tungstic acid, which is the highest reached by any scheelite put on the market. Since then the mine has been a regular producer of gold and scheelite. The first year's output of scheelite was of a value of £6,000 (about \$30,000). Each year improvements have been made to the plant, which is now equipped with the very latest and best appliances. An assay plant has been erected for determining the amount of gold in the stone and for the assay of tungstic acid in the scheelite. Systematic assaying has shown that the tailings contain half an ounce of gold to the ton.

These have been saved, and there is now about 8,000 tons of tailings awaiting treatment by cyanide.

"A year ago the brothers opened up and erected a plant on their Tungsten mine, situated about five miles west from the Golden Point mine, but on the same line of reef, and about six miles from Hyde. The two mines together employ about 50 men.

"The uses of scheelite, or more properly speaking tungstic acid, which is extracted from it, are various. It is used as a mordant in calico printing, as a constituent in some finer grades of paint, and renders clothing non-inflammable. Its greatest use, however, is in the manufacture of steel of the very highest grades, such as engineers' tool steel for turning lathes and steel for the inner tubes of big guns. Its characteristics are great density, toughness, and hardness. Such steel is placed on the market by different makers under a variety of names—nickel tungsten steel, high-speed steel, self-hardening steel, etc. It has within the last few years revolutionized engineering methods. A 1-in. lathe operating on mild steel has removed as much as $7\frac{1}{2}$ cwt. of parings per hour. The lathe may be driven at a speed so great that it becomes glowing hot, yet it does not lose its temper, and is therefore an ideal tool steel. Turning work can now be done at less than half the former price, and work which formerly was done at the forge is now done with this steel in the same time that it would take to heat the iron. The steel would be more largely employed but for the fact that the old style of lathe is not strong enough or high enough in speed to make the best uses of it. There is an increasing demand for scheelite, and the future of these mines may be looked forward to with confidence. Their development opens up a new field for the employment of labour and the investment of capital."

The correspondent of the *London Mining Journal* at Johannesburg, Transvaal, shows the labour situation there in connection with the mining industry as being in strong contrast to that in the mining regions of Canada and the United States. Writing on August 3 to the journal mentioned he said concerning the miners' strike in the Transvaal: "The strike leaders have made a rapid change of front, and suddenly declared the dispute at an end. They claim a victory with all the impudence of their class, in spite of the fact that all the mines have been full up for some time past. The fact is, they realized the game was up; the men deserted their leaders and sneaked back to work in tens and twenties. Those unable to secure work expected to draw money from the strike funds, which were very low; so as a means of shifting this liability the strike was declared over. Versatile Mr. Outhwaite, who is in England, claims a great victory for the men; let him come here and see the hundreds who, before the strike were earning good money, now find their places filled, whilst they walk the streets without the price of a meal in their pockets."

COPPER ORES OF BOUNDARY DISTRICT.

BOUNDARY DISTRICT was visited a few weeks ago by Geo. L. Walker, editor of the *Butte Commercial* and writer of the widely-read "Walker's Weekly Copper Letter." Mr. Walker afterwards published his observations on the copper mines and smelting works of the district. Included in his comments were the following:

"There is evidence that the copper ore deposits of the Boundary district were formed in a comparatively

geological to explain the absence of secondary enrichment. Thus, the ore is in its primary state, across the wide distance supposed to have existed, and leaching, which leaching did occur previous to the recent glacial period, and the capping and secondary enrichment zone were ground off by the glaciers, leaving the primary ore exposed. It is probable that all three factors contributed to bring about the Boundary district ore deposit."

"The absence of secondary enrichment accounts for the very low grade of the Boundary ores. On the



Exterior View of part of British Columbia Copper Company's Smelter at Greenwood.—Showing Down-take Pipes from the three 700-ton Blast Furnaces to Dust Chamber. The Slag Car Run-way is on the Near Side of the Furnaces, as viewed, and the Converter Floor on the far side.

recent geological period. The ore is in its primary or original state. There is not as much secondary enrichment, oxidation and leaching in the entire district as may be found in one acre of ground in Butte, Globe or Bisbee. It is a safe estimate that 99 per cent. of all the copper being mined by the three leading companies occurs in chalcopryrite form. This mineral comes to the very surface, and in one instance I saw it protruding, when the dirt had been removed from an ore deposit.

"In a few places the ore shows weathering to a depth of a few inches, and azurite, malachite, bornite and other minerals of copper occur in very small quantities. Three theories are advanced by different

other hand, it simplifies the mining and smelting, and contributes to the investment character of the mining enterprises. There is good reason for the prediction that all the mines operating in the district a generation hence will be handling ore which will yield within 1 to 2 lb. of copper and 10 to 20 cents per ton in gold and silver of what are being secured today. The ore bodies are being mined already about as deep as they go, their position, as a rule, being more or less flat, and all the way from the surface to a depth of 1,000 ft. Were it not for the fact that the ore is usually 200 ft. or more in thickness, its semi-horizontal position would operate against low mining costs.

"Because of the uniform character of the Boundary ores, it is possible that some method of water or magnetic concentration may eventually be used before smelting, thereby greatly reducing production costs.

"The ideal way to operate the Boundary mines would be to smelt all the ore in one plant, thus economizing in management, clerical forces, laboratories, sampling mills, travelling expenses, freight, and in many other directions. The logical outcome of conditions developing here now will be an ultimate consolidation of the several operating companies. Notwithstanding that all three companies are strong enough to go alone, they would do better united."

SHIPPING TRADE OF NORTHERN MINES.

NORTHERN MINES are increasing in number and importance. Among other evidences of this fact is the steady expansion of the shipping trade between southern British Columbia ports and northern mining districts. Capt. S. F. McKenzie recently gave the *Victoria Times* the following information:

During the past summer the McKenzie Bros.' steamers have carried about 63,800 tons of ore, representing in value approximately \$1,000,000, from Prince of Wales Island and Whitehorse, for the smelters at Ladysmith and Crofton. The greater proportion of this ore came from the Mount Andrew, Karta Bay and Sulzer mines, all on Prince of Wales Island, in southeast Alaska. All of the ores, with the exception of those from Whitehorse, represent trade which has been diverted to British Columbia smelters, from the American side, by the shipping facilities provided by McKenzie Bros. and the hustling they have done to get the business. In their northbound trips the steamers have transported 150 carloads of machinery, for the Guggenheim interests in the Yukon. These shipments consisted largely of steel hydraulic pipe. From British Columbia ports they carried 1,350,000 ft. of lumber to Skagway, and in addition to this about 500,000 ft. of building material for boats, barges, etc., for the White Pass & Yukon Railway, this last going from mills in Victoria. Of general merchandise they carried about 8,000 tons. Then there were 2,500 steers, 3,000 sheep and 500 hogs. All these shipments were for points in the Yukon, and represent business done since April last.

In order to handle this business McKenzie Bros. had in commission the steamer *Haldis*, of 2,800 tons, her sister ship, the *Halvard*, of like tonnage, and the steamer *Henriette*, of 1,200 tons, also the barges *Hayden Brown*, 1,200 tons, *Melanope*, 3,000 tons and *Canada* 600 tons.

Capt. McKenzie said further that vessels were that week taking 700 tons of coal to the whaling stations on the West Coast, 125 tons for Ikeda Bay and Jedway on Moresby Island of the Queen Charlotte

group, and 600 tons for Skagway, Alaska. This last shipment was leaving on the *Haldis* the next day. The steamer would bring down 2,800 tons of ore for Ladysmith from Mt. Andrew on the return trip. The *Halvard* had just arrived at Ladysmith with 2,800 tons of ore from Karta Bay and Sulzer. She was to take out 200 tons of freight for Prince Rupert and about 800 tons for Skagway. On the downward trip she would call at Sulzer for a full cargo of ore.

DEATH OF A PIONEER PLACER GOLD MINER.

ROBERT C. DORE, a pioneer of the Kootenay country who came to the Province in 1864, died at the St. Eugene hospital, near Cranbrook, East Kootenay, on August 31. From a lengthy obituary notice written for the *Cranbrook Herald* by R. L. T. Galbraith, Indian agent at Fort Steele, it is learned that the late "Bob" Dore was one of a party of placer miners who in 1864 discovered gold on what was afterwards called Wild Horse Creek. News of the richness of the creek soon spread and somewhere about 4,000 miners were attracted to it to "try their luck." Dore worked on the creek, with varying success, until 1872 and then left for the Cassiar country. Later he lived at San Francisco for a while; next he went to Arizona; then he returned to California; afterwards he was at Butte, Montana; finally he drifted back to Wild Horse Creek, where he had lived the last 15 or 16 years. Mr. Galbraith concluded his notice of this old pioneer as follows:

"R. C. Dore was a man widely known for his many generous acts, liberal and large hearted, when he had money, he was always ready to share his last dollar with a friend, or espouse the cause of anyone who had a grievance that he thought should be redressed. He leaves a widow and daughter to mourn his loss.

"When the history of Kootenay shall be written the name of Bob Dore, a man who tried to do his part in opening up and developing its mineral resources, should not be overlooked, and now that he is gone let us cover the few faults he may have had with the broad mantle of charity, and let our prayer be 'peace to his ashes.'

"Of the old pioneers of 1864 only a few remain. They were a noble band of energetic and fearless men, who did a great and good work in bringing to the notice of the outside world the vast resources of our wonderful Kootenay district. The hardships which these men endured very few of the present residents can realize."

The *Katalla Herald*, published in Alaska, has been informed that Alaska smokeless coal will soon be on the markets of the Pacific coasts of North and South America.

CONDITIONS IN THE SKEENA COUNTRY.

OF THE TELKWA mineral belt some reliable information, obtained from Geo. R. Naden, M.P.P. for Greenwood, on his return from that district, was published in the *Miner's Record* of October, 1906 (pp. 401-2). Last May Mr. Naden again went north and, after spending four months in the Skeena country, is further favorably impressed with its capabilities and prospects. When in Nelson lately on his way back to Greenwood, asked by the *Daily News* as to his opinions with regard to that country as a district for settlers and for mining Mr. Naden replied: "I think the country is all right. There is a lot of magnificent land which is capable of growing very good crops indeed. The trouble is that so much of it is blanketed by South African scrip and speculative purchase that the homesteads of the real settlers are far too much scattered to permit of the founding of any really substantial towns. The timber in the country is small and as timber, at all events just now, is worth very little. On the other hand it is not difficult to clear the land. But again the problem of transportation comes in. The settler finds it of infinite inconvenience to get in his supplies and naturally there is no rush for settlement.

As for the mining position, that is far different. There are numberless outcrops of all kinds of minerals and the big blow-outs that are to be seen, the big veins to be traced here and there all over the Bulkley Valley, the Babine Range and other places, veins that rival in extent the famous Boundary district showings and which will go even better on an assay, must make the country. But in the meantime supplies cost too much for successful working. There has been a lot of surface work done. One company alone has spent \$50,000 in this direction. But everything waits upon the railway. When that shall come the district must go ahead.

"It is probable the first terminal of the Grand Trunk will be Kitimat, inasmuch as the head of Kitimat Arm is only 40 miles over an easy grade from Kitsilas Canyon on the Skeena River, past which the new railway must be constructed, whereas Prince Rupert is 70 miles beyond, over a difficult country. Beside, an old charter for a railway from Kitimat to Hazelton, carrying a subsidy, has been acquired by the Grand Trunk Pacific Company and by building to Kitimat this subsidy could be earned."

Early in September an ingot of gold from the Cariboo Gold Mining Company's big hydraulic mine at Bullion was brought to Ashcroft to be forwarded thence to whatever destination the company had consigned it. The *Ashcroft Journal* guessed its value to be about \$20,000, but as absolutely no reliable information appears to have been available upon which to base an estimate, this must be regarded as only a guess.

PROGRESS AT THE ROSSLAKE COMPANY'S MINE AT ROSSLAKE.

ROSSLAKE MINE.—My own mine produced a permanent product since that time in their history. Among others, that of the Ross Lake mine, which is now being worked with increasing profit, is a result of the reports and cables sent by the resident manager to the company's head office, London, England.

For August the manager reported:

"West Poorman Tunnel. Drive a distance of 37 ft. was driven. The object of this work is to connect with the main Poorman tunnel. Work was started immediately below an old prospecting shaft which contains a fairly good showing. This tunnel is also approximately parallel to, and 80 ft. above, the Mayday tunnel—the Mayday tunnel being driven on the western end of the Poorman vein. The drive is not yet in solid country.

"Mayday Tunnel. 34 ft. 6 in. was driven to top of small prospect shaft which was broken into towards the end of the month. The average assay met with 1.2 oz. 6.18 oz. gold and 6.8 per cent. copper over a width of 5 in.

"700 ft. This was stopped upward a distance of 53.7 ft. to tap the ore on the sill floor of stope 4 and broke through on the last day of August. As yet only narrow streaks of mineral have been met with. The average assay has been 0.71 oz. gold and 3.2 per cent. copper over a width of 11 in. The ore will now be stoped underhand into the raise, and as work progresses eastward we expect to meet with some high grade ore.

"700 drift—This drift on the H ore body was driven westward a distance of 124.9 ft., but has not met with good values up to the present. The average assay has been 0.04 oz. gold and 0.6 per cent. copper over an average width of 15 in."

Three cables published in England in September follow:

"Diamond drill hole No. 111, 300-ft. level, vertically above stope No. 32 has struck ore 43 ft. to 50 ft., 4 ft. of which assays 0.30 oz. gold, 2 per cent. copper. It is undoubtedly H vein. Assays remaining 3 ft., will be forwarded on as soon as possible."

"In reference to my cable, dated the 12th, 2 ft. out of the remaining 3 ft. assayed gold 0.34 oz., copper 2.6 per cent. Remaining 1 ft. on the foot-wall side of the vein assays gold 0.16 oz., copper 0.9 per cent. Average assay of ore is, over 7 ft., gold 0.29 oz., copper 2.01 per cent."

"Diamond drill hole 112 has struck ore, H vein, 300-ft. level, from 67 ft. 6 in. to 69 ft. Assayed gold, 0.24 oz.; copper, 1.50 per cent. This is about 30 ft. distant from and to the west of tramway dyke. We shall commence to drive on vein with two drills before the end of the month."

RECENT DEVELOPMENTS AND PRESENT PROSPECTS OF THE YMIR MINE.

Expert Opinion Indicates Occurrence of Another Important Lode.

ANOTHER VEIN OF ORE is believed to exist in the Ymir mine. Reasons for this belief are contained in a report made to the directors of the Ymir Gold Mines, Limited, by the company's consulting engineer, R. Gilman Brown, from which report the following has been extracted:

"It will be remembered that there is indisputable evidence, in large and small pieces of rich float scattered plentifully over some 200 to 300 ft. along the surface 100 ft. or more up the hill from the Ymir vein, of the existence of a new vein. The natural assumption on which the first work of search for this was prosecuted was that this vein was parallel to the old vein. A complete cross-cutting of the surface by trenches and shallow tunnels did not show any such vein, but did find several dykes and faults not hitherto known to exist, and so interlacing that they might easily obscure the outcrop. Exhaustive study devoted by the manager, Mr. Nichols, to the underground workings while this work was in progress disclosed some features that pointed strongly to the existence of a transverse vein, which might have had by its intersection with the Ymir vein a strongly enriching influence upon that vein. At the same time it was shown that a vein in this position could have furnished all the float, and the surface showing of a large crack or fissure about in the place where this vein should have occurred was corroborative evidence of its existence. Additional work was instituted on the lines of this theory, but here again we have so far to face disappointment. There are still some portions of this work to be completed, but if we are unsuccessful in this we are driven to the conclusion that either, as already suggested, the action of faults or dykes has obscured the new vein on the surface or that the float came from a projecting point or points of ore, the rest of the vein being 'capped,' as seems to have been the case with the original Ymir vein. The first of these alternatives demands elucidation. If the new vein were cut near the surface by a flat-lying thrust fault a block of ore would have been sheared off, and subsequently disintegrated by natural forces so as to form the float. At the same time this fault would have covered the vein so that it would not now show at surface.

"With both of these contingencies in view we are now searching for clues on the surface, critically examining all dykes, faults and seams, for any evidence they may furnish as to the capping fault. At the same time we are cross-cutting through the Rockland dyke from the long northwest cross-cut on the 200-ft. level with the double purpose of determining whether the Speak fault could have been the obscuring factor, and of prospecting for any vein that would answer to the second alternative.

"In the two and a half months available this season for outside work we shall have exhausted the possibilities of the surface and proven the ground from the 200-ft. level to within 250 ft. of the Ymir vein. Through the winter work can be prosecuted to advantage in pressing the cross-cuts here to the northwest under the ground already embraced in our surface work.

"In carrying out this search for the new vein we have accomplished some 1,500 ft. of shallow tunnel and cross-cuts in less than five months. That so much has been done in such a short time is due to the skill and energy of Mr. Nichols. While so far we have met with disappointment in this search, the present season's work is by no means thrown away, for we have gained knowledge that was heretofore wanting on the general geological situation on the hill, and if we shall be able to carry the work through to successful completion it will be to the greatest advantage to us in subsequent operation. It should also be pointed out that the old workings on the Ymir vein afford the best possible means of attack on the ore bodies that must exist in the undiscovered new vein, and once the vein shall have been located will make its opening up simple and inexpensive.

"One thing is clear to everybody who has been over the ground, viz., that somewhere in a comparatively small tract of hillside, there exists a vein similar in character to the Ymir, carrying ore of as good, if not better, grade, and it must be admitted that with the large amount of work done this season we are now in a better position than ever to find it.

"From the first of March to the end of July, we accomplished nearly 800 ft. of development work in the old vein. This work was in many places apparently successful in that considerable faces of good payable ore were disclosed in it, so much so that we felt justified in again starting up the mill. Here, however, we met with disappointment; after a very short period of work the ore in almost all of these faces dropped in grade, so that they became unprofitable to work, and after a short run it was thought desirable to close the mill down.

"On the strong advice of Mr. Nichols, in which, in view of the proven irregular occurrence of the ore in the near portions of the vein and of the general conditions, I concurred, we were led to abandon for the present all stopping on the old Ymir vein and milling the product. This is not to say that we have given up the idea of further profitable ore shoots in the Ymir vein, but it appears that in the particular region which we can now prospect, the values are very 'spotty' and cannot be relied upon to extend any considerable distance, and therefore cannot be mined alone with any assurance of profit. Mr. Nichols is of the opinion that the Ymir ore shoot was due to enrichment from a transverse vein, and that it is towards the southwest that we must look for the continuation of our surface shoot. The great bulk of the work in the mine, however, has

been done towards the northeast, and as it means expensive driving on each of the existing levels to prove this point, and would occupy a great deal of

time and involve large expense, it has occurred that for the present the interests are restricted and energy spent on the north but not on Ayrton."



A view down one of the slopes of the Voss Mine, Ayrton, showing the shaft.

The Minister reported in the "Annual Report of the Minister of Mines" for 1911: "The Department received at Montreal, in 1911, the 'Annual Report of the Voss Mine' from the Voss Mining and Smelting Company, Limited. The report is a valuable contribution to the knowledge of the Voss Mine. It contains a detailed description of the mine, its history, its production, and its future prospects. It also contains a list of the names of the persons who have been connected with the mine since its discovery in 1881. The report is a valuable contribution to the knowledge of the Voss Mine, and it is a valuable contribution to the knowledge of the mining industry in general. It is a valuable contribution to the knowledge of the mining industry in general, and it is a valuable contribution to the knowledge of the mining industry in general."

GEOLOGICAL SURVEY WORK IN THE SIMILKAMEEN DISTRICT.

IN THE SIMILKAMEEN the Geological Survey of Canada has been continuing its investigations this year. It is desired by those interested in the development of the varied mineral resources of that large district that the scope of the Survey's operations shall be enlarged. The *Similkameen Star* on September 18 made the following comment:

Charles Camsell, geologist, of the Geological Survey branch of the Dominion Department of Mines, was in Princeton last week on his way to Agate Mountain, near Wolf Lake, where his party will make a collection of the agates to be found in large quantities there. Last year Mr. Camsell took to Ottawa some of the agates, which proved to be of great interest to the students of petrography there. Since then the stones have been in large demand all over the country by collectors. Agates are beautiful when polished but are not much used in fine jewelry. There is at Wolf Lake a mountain of them, which may prove to be of considerable economic value. Mr. Camsell has about completed the work of the season, which was much shorter than that of last year.

The importance of the Similkameen as a field for mineral research and scientific study demands that it receive closer inspection and larger appropriations from the Department of Mines. An exhaustive study of the origin and source of the platinum placers of Granite Creek and Tulameen River may result in the discovery and operation of large platinum mines. In any case a scientific investigation and report thereon is due from the Dominion Department of Mines. So far the only examination and report of any importance was made by Prof. Jas. F. Kemp, of Columbia University, New York, for the United States Geological Survey (see Bulletin No. 193). The attention of the Hon. Mr. Templeman, Minister of Mines, is respectfully directed to the platinum resources of the Princeton district with a view to further discoveries.

Mr. Camsell may find time to make a hurried visit to Granite Creek and the North Fork coal banks before returning to Ottawa. It is hoped that next year he may have instructions to study platinum conditions here.

G. R. Naden, M. P. P. for Greenwood, has returned from his second visit to the Telkwa and Copper River district. He has made investments in mining property there, but considers that prices asked for undeveloped properties at present are too high. Speaking about the Telkwa, Mr. Naden said: "It will be one of the big camps of the province, providing the wonderful surface showings indicate ore bodies that go down. The ledges appear to have continuity and there is enough ore to warrant the building of a railroad in from the coast, independent of the Grand Trunk Pacific."

THE AMERICAN MINING CONGRESS AND FRAUDULENT MINING SCHEMES.

PROMOTERS of fraudulent mining schemes are not now permitted to carry on their swindling operations in some parts of the United States as freely as in the past. Following the activity of Lewis E. Aubury, state mineralogist for California, who has succeeded in having some of the swindlers punished, comes the information that seven of the states have passed laws similar to that which went into effect in Connecticut on September 1. This law forbids the publication of exaggerated and false statements regarding the value of mining property, and is aimed at promoters of "fake" mining schemes. Its violation is punishable by a maximum of 10 years in the penitentiary.

Regarding the attitude of the American Mining Congress in this connection a mining newspaper at Denver, Colorado, says:

There is much encouragement for those engaged in legitimate mining enterprises in the announcement recently made by the press dispatches that some of the leading members of the American Mining Congress will hold a meeting in Denver in a few days to prepare plans for obtaining the passage of some mining legislation intended to put fakers out of business. A despatch states that members of the mining fraud committee, which consists of mining men of broad experience, for nearly six months have been considering the establishment of some method by which the fraudulent mining companies may be put out of commission, and at the meeting suggestions representing extensive preparation will be represented.

The mining fraud committee consists of C. J. Downey of Denver, R. L. Herrick of Scranton, Pa., A. W. McIntyre of Everett, Wash., H. C. Beeler of Cheyenne, Wyo., and Judge W. F. Clarke of Glover, Vt.

There is much work for this body of men to perform, for fakers are thick and their schemes multifarious. The laws must be comprehensive to cover all the methods employed to wheedle money out of persons who hope to get fortunes out of the ground. They should not only deal with those palpable deceivers who promote alleged enterprises that have no merit; who deal in grossly exaggerated advertising matter; who sell stock in companies and pocket the proceeds without doing development work on mines or claims, but they should also hedge about stock manipulators if the ingenuity of man can devise a statute that would reach this class of malefactors.

The Similkameen Star states that J. E. McCauley has started a gang of men on the Reco mine, and will work six or more men during the winter. Necessary buildings are now being erected and things put in shape. The first work to be taken in hand will be a cross-cut tunnel to tap the lead. The working force will be increased as occasion demands.

COMPANY MEETINGS AND REPORTS

TYEE COPPER COMPANY, LIMITED.

The secretary (Mr. W. Gardner) read the notice convening the meeting and the report of the auditors.

The chairman said: "Gentlemen,—The balance-sheet having been in your possession for some days, I presume it is your wish that it be taken as read. Before proceeding further, I take this opportunity of expressing our sorrow, in which I feel sure you all join, at the loss sustained since our last meeting through the decease of our friend and co-director, the late Mr. Ludwig Loeffler, who was a tower of strength in the deliberations of the board. His son, Mr. H. Loeffler, at the unanimous wish of the other directors, kindly consented to fill the vacancy. Before moving the adoption of the report and Balance Sheet I crave your attention for a few moments while we peruse the accounts in the order they appear in the report. Profit and Loss Account—The maintenance, repairs and depreciation at the mine, £2,606 17s 10d, and at the smelter, £2,182 15s 7d, amounting to £4,789 13s 5d—this, you will find on referring to your last year's report, is much smaller owing to the fact, which I then explained, that the depreciation we then wrote off was 25 per cent., whereas this year it is 10 per cent., which we consider ample. The whole of the cost incurred during the year for prospecting and developing, £12,532 10s 6d, and new outlay £3,221 14s 11d, has been paid for out of revenue. On the credit side the figures explain themselves. Everything in the Revenue Account is so plain that I will not detain you by going over it. I now desire to draw your attention to the Balance Sheet. On the debtor side the item sundry creditors comprises the usual monthly accounts, which have all been discharged, with the exception of income tax. On the credit side everything is stated clearly. I shall have much pleasure in asking you to confirm a recommendation of the board to pay a dividend on August 1, 1907, at the rate of 7½ per cent. per annum, free of income tax. I regret that the long-looked-for ore body has not yet been found, though your local director, Mr. Clermont Livingston, is still hopeful that we shall eventually succeed, and I would have you understand that we have still a large extent of property yet unexplored. At the same time I must congratulate you on the improving conditions of our smelting business, which has principally arisen from the opening up of copper mines in Alaska, the Yukon Territory and on the Pacific coast. The mines in these districts are only in their infancy, and several large contracts have already been made with our smelter. The position of Ladysmith as a smelting centre is excellent, being connected as it is by both rail and sea. Matters are now having the earnest consideration of your board as to the wisdom of duplicating the capacity of your smelter. Plans, etc., with this object in view arrived yesterday from our general manager, and these will, of course, receive our careful attention. I take this opportunity of informing you that at the express wish of the board I am making arrangements to visit the mine early next month, so as to confer with Mr. Livingston on certain important matters. I have now much pleasure in moving: 'That the report and accounts as now presented be and they are hereby received and adopted.' After this has been seconded, and before putting the resolution to the meeting, I shall be very pleased to answer any questions, as far as it is in my power to do so."

Mr. Nicol Brown seconded the motion.

A shareholder asked why an alteration had been made in the form of the monthly report and why the shareholders were not informed as to the value of the custom ore treated.

Mr. Root congratulated the directors on the excellent way in which the Balance Sheet was produced. It was the clearest

who deserved the hearty support of the shareholders. Like all mining concerns, they had had their difficulties, though

way in which they were looking at things, and he did not

more than the market value of the shares, they should spend those assets in too much prospecting. There was more than sufficient work for their smelter to do, even without using any Tyee ore at all, and it seemed quite possible that the company might be developed from a mining undertaking into a commercial smelting concern, paying good dividends from that business alone. They had a large amount of land to exploit, and seemed to propose spending the company's assets on its exploitation, but he, as a shareholder, was not anxious to run a very speculative business with the idea of trying to find copper properties or copper ore when they knew there were hundreds of other copper properties with ore in sight, which this company acquire and begin to work at once if they wished to use their money in that way. After urging the need for the exercise of economy, and urging that if exploratory work were to be done, it should be done by other people under royalty from the company, the speaker concluded by thanking the directors for the splendid and straightforward report they had produced under somewhat adverse circumstances.

A shareholder: "Is it possible to make a profitable business of smelting alone?"

The chairman: "Yes. The first question put was as to the alteration of the form adopted in sending out the report. We altered it because whereas, in the early part of the time, the smelting was chiefly of the Tyee ore, and the custom ore was an adjunct, in the last few months there has been a larger portion of custom ore smelted, and we altered the form of report accordingly. We do not feel inclined to make public all the figures of the custom ore; it is a business, and you must have confidence in your directors that they will conduct that business properly. To tell all the figures would be decidedly wrong. We go into everything carefully; indeed, there is not even a trilling detail that we do not investigate. With regard to the mine, we are not going to spend money extravagantly and waste the capital we have in finding a fresh body of ore, but when we know there are certain indications which point to the existence of such ore, if we were to sit down and not pursue our investigation, I should say we were not fit to conduct your business. You may rest assured we have your interests at heart, and do not intend to spend the company's money needlessly. If, however, we let other people make this investigation and they come across a good body of ore, as we hope we shall, you would say we were very simple! We are certainly not going to do that. We are going to investigate carefully; and I may say that all that we have spent in this direction has come out of profits. It can be shown that we have a large amount of money available, but it is not the object of the Tyee Company to return that money, and we do not intend to do so, but rather to use it to the best of our ability and conduct the business properly. Our smelting business is growing fast, and for that reason plans of the proposed addition have been sent over, and I am going out to confer with the manager in regard to the subject. I have no doubt it will be eventually a very good business. But at the same time we have every reason to hope we may find a good body of ore, and, if we do, the value of the property will be doubled or trebled. Are you going to sit still because you are timid and will not spend any money? Surely you have confidence that we will not spend your money unnecessarily. We have written the property down and have pursued a very conservative policy, because even when we have paid this dividend we shall have something like £107,000 left. We have not frittered your

money away, but have spent it wisely, and shall continue to do so. We shall not take up a different attitude from what we have been doing, and I hope that in that we shall have your support. With regard to the profits on smelting, we do not tell anything of that sort to anyone, any more than any of you would give details of your own professional business to anyone else who was similarly engaged."

The motion was carried unanimously.

The chairman next moved: "That a dividend at the rate of 7½ per cent. per annum, free of income tax, be and it is hereby declared and payable on August 1 to all names stand-

ing on the register of members on June 24, 1907." The motion was carried.

Messrs. T. H. Wilson and H. Loeffler were re-elected directors, and Messrs. Everett Morgan and Grundy re-appointed auditors.

Mr. Judge proposed a vote of thanks to the chairman, directors and the staff at the London offices and in British Columbia, remarking that the whole company had been managed exceedingly well and that all the shareholders would be interested in the further developments which Mr. Wilson might be able to tell them about when he returned from his visit to the property. The vote was unanimously accorded, and the proceedings terminated.

BALANCE SHEET, AS ON APRIL 30, 1907.

Dr.

To Capital—Authorized, £180,000.

Issued and Subscribed, 180,000 ordinary shares of £1 each, fully paid	£	s.	d.	180,000	0	0
" Sundry creditors				7,378	11	1
" Revenue account				19,341	6	3
				£206,719	17	4

Cr.

	£	s.	d.	£	s.	d.	£	s.	d.
By Properties, concessions, etc., as per last Balance Sheet	62,545	13	2						
" Properties acquired during year	3	2	6						
	62,548	15	8						
Less written off, 10 per cent. as per Revenue Account	6,254	17	8				56,293	18	0
" Mine—									
Plant, machinery, tools, etc., as per last Balance Sheet	4,347	3	0						
Less depreciation, 10 per cent.	434	14	4	3,912	8	8			
Buildings and permanent works, as per last Balance Sheet	2,476	12	7						
Less depreciation, 10 per cent.	247	13	3	2,228	19	4			
Live Stock, as per last Balance Sheet	316	5	2						
Less depreciation, 10 per cent.	31	12	6	284	12	8			
Wagons, as per last Balance Sheet	112	15	7						
Less depreciation, 10 per cent.	11	5	7	101	10	0			
Furniture, as per last Balance Sheet	285	2	6						
Less depreciation, 10 per cent.	28	10	3	256	12	3			
							6,784	2	11
" Smelter—									
Plant, machinery, tools, etc., as per last Balance Sheet	4,285	1	11						
Less depreciation, 10 per cent.	428	10	2	3,856	11	9			
Buildings and permanent works, as per last Balance Sheet	4,866	2	4						
Less depreciation, 10 per cent.	486	12	3	4,379	10	1			
Live stock, as per last Balance Sheet	121	6	4						
Less depreciation, 10 per cent.	12	2	8	109	3	8			
Furniture, as per last Balance Sheet	74	19	1						
Less depreciation, 10 per cent.	7	9	11	67	9	2			
							8,412	14	8
" Aerial Tramway, as per last Balance Sheet	4,051	8	2						
Less depreciation, 10 per cent.	405	2	10				3,646	5	4
" Stocks on hand—									
Cordwood	1,199	12	6						
Fluxes	239	11	9						
Coal and Coke	591	13	4						
Mine stores	1,519	16	6						
Smelter stores	371	0	10						
Fodder	105	16	3				4,027	11	2

Received from—

Being amount of Mine Development and Commission written off to

Profit & Loss

And balance carried forward from last year's account

Invested as follows—

	£	s.	d.
2½% Consolidated Stock.....	11,516	4	7
2½% Irish Land Loan.....	11,350	2	1
2½% War Loan.....	10,321	0	4
3% Transvaal Govt. Stock.....	3,063	3	7
3% L. & N.W. Ry. Pref. Debs....	9,000	0	0
3% L. & N.W. Ry. Con. Debs....	8,440	0	0
3% L. & S.W. Ry. Con. Debs....	6,200	0	0

£56,147 13 11

Deposit Account No. 1.....

£56,147 13 11

B. Investments—

2½% M.W. Ry. Pref. Stock.....	8,750	0	0
3% East India Ry. New Debs....	5,000	0	0
3½% India (1931) Stock.....	6,000	0	0
2½% Irish Land Loan.....	8,000	0	0
3% Indian Govt. Inscribed Stock.	5,000	0	0
2½% Consolidated Stock.....	10,654	4	
3½% Great Central & Midland Ry. Guaranteed Stock.....	3,000	0	0

£50,378 19 2

" Cash at mine	2,234	14	7
" " at office	5	0	5
" " at bank	452	2	5
" " at deposit No. 2 account	3,000	0	0
" Sundry Debtors			
" Ores on dump and at smelter at cost of labour and mining charges	1,006	0	0
" Custom ores	10,562	18	4

50,378	19	2
106,520	13	11
3,763	4	5
11,569	13	4
£206,719	17	4

ROSSLAND-KOOTENAY MINING COMPANY, LTD.

The report of the Rossland-Kootenay Mining Company, Ltd., for the seventeen months ended January 31, 1907, presented at the meeting held in London, England, on May 28, stated that the time had not yet arrived when a satisfactory market could be obtained for the ore produced from the Kootenay mine, and consequently it had not been possible to recommence operations at this mine. The adverse conditions which affect the possibility of working the Nickel Plate property at Rossland still exist. These conditions are entirely beyond the control of the board and prevent the adoption of any other than a waiting policy. Every possible effort has been made to effect a consolidation with other interests, but this has not been found practicable. The directors still feel justified in believing that the Kootenay mine ore will yet be required in the district for fluxing purposes. Toward the end of last year the board requested Messrs. Hill and Stewart to thoroughly examine and report upon the Columbia-Kootenay mine. The report, which is of a lengthy and technical character, has now been received, and is available for the inspection of shareholders. The mine is already well developed with undoubtedly a very large tonnage of solid but low grade minerals showing at various points. Messrs. Hill and Stewart point out that, owing to its location, the mine may ultimately have a considerable value. In effect the report justifies the directors in the opinion they have already expressed—namely, that the mine can only be worked with profit if operations are conducted on a considerable scale and a ready market found for the ore containing an excess of iron over silica. Exploration work

would have to be mainly directed to the deeper workings below the No. 6 tunnel, in the hope of enrichment in depth, but this work would be costly and subsequent mining operations could only be carried on at an increased expense. At the present time the principal value of the mine lies in the direction of its being a flux producer, and until the demand for this class of ore by British Columbia smelters becomes acute it will be impossible to obtain such terms as will enable the general body of ore in the mine to be profitably worked. Persistent efforts have been made by the board to dispose of the surplus portion of the surface equipment and other property in Rossland which would not at any time be essential for the requirements of the company. The property sold has realized £1,286, of which £731 represents a profit on the price at which Block 12 stood in the books, after having been heavily written down. The directors have given consideration to a number of properties in Mexico which have been submitted to them, but up to the present none of these have been of such a nature as to justify the directors in dealing with them. The report was adopted.

The Daly Reduction Company held its annual meeting of shareholders at Hedley, Similkameen, on September 11, when practically all the stock was represented either in person or by proxy. The officers re-elected for the ensuing year were: President, Marcus Daly; vice-president and treasurer, John C. Lalor; managing director and secretary, Frank A. Ross. J. W. Gerard was also elected a director.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi.—August: Shipped from the mine to Northport during the past month 2,950 tons ore, containing 823 oz. gold, 1,450 oz. silver and 70,650 lb. copper. Expenditure on development work during the month \$11,000. Owing to the Northport smelter having been closed during the greater part of the month only small shipments have been made. A considerable supply of coke is now on hand, and three furnaces are running at the smelter. Have struck pay ore in 300-ft. level south; drift is now in 70 ft. Extent at present unknown, development proceeding. (Office note—As shipments of ore from the mine ceased on August 7, owing to the closing of the Northport smelter, no estimate has been made of the profits for the month. A number of men were laid off at the mine during the month and the remainder were working on development. Both mine and smelter are now in full working order again.)

Le Roi No. 2.—Josie mine report for August: Shipped 1,320 tons. The net receipts are \$13,500, being payment for 960 tons shipped, and \$1,050, for 78 tons concentrates shipped; in all \$14,550. Expected to have shipped more, but have been prevented by railway car shortage; only 40 cars were obtained. There is to be a Government inquiry with regard to coke shortage.

Le Roi No. 2.—Vancouver mine report for August: No shipments. The net receipts are \$8,070, being payment for 79 tons concentrates shipped. Total amount crushed, 2,300 tons. Zinc concentrates, 123 tons assayed silver 33.9 oz., lead 1.9 per cent., zinc 42.6 per cent. Approximate value—Concentrates made \$9,400.

Stnoeshoe.—During August the lessees have shipped 14,000 tons.

Tyce.—August: Smelter ran 31 days, treating 1,588 tons of Tyce ore, value, after deducting refining charges, \$14,567; 5,347 tons of custom ore; total, 6,935 tons, producing 590 tons of matte.

U. S. A.

Alaska Mexican.—August: 120-stamp mill ran 30¾ days, crushed 22,394 tons; estimated realizable value of bullion, \$30,077. Saved 425 tons sulphurets; estimated realizable value, \$25,415. Working expenses, \$22,781.

Alaska United.—August: Ready Bullion claim 120-stamp mill ran 30¾ days, crushed 21,000 tons ore; estimated realizable value of bullion, \$20,199. Saved 347 tons sulphurets; estimated realizable value, \$10,452. Working expenses, \$25,900.

DIVIDEND.

On September 3 the board of directors of the Granby Consolidated Mining, Smelting and Power Company, Limited, declared a regular quarterly dividend of two per cent. and an extra dividend of one per cent. upon the par value of the stock outstanding, payable September 30, inst., to all stockholders of record at 3 o'clock, p.m., on September 13. This will be dividend No. 8, amount \$405,000, and will bring the total amount of profits distributed among the company's stockholders up to \$2,968,630.

NOTES.

A meeting of shareholders in the company holding the Spyglass property, in Poplar camp, Trout Lake mining division, was called for September 28 at Nelson, to consider an offer of an option. The *Canadian* stated that if this offer were refused the company would itself resume operations.

The annual meeting of the Canadian-American Coal and Coke Company was held at Frank, southwest Alberta, on September 14, when the financial statement and the general manager's report were submitted, and directors and officers were elected.

Early in September it was announced that at last the La Plata Mines, Limited, owning the mine formerly known as the Molly Gibson, situated on Kokanee Creek, Nelson, mining division, has obtained all the teams it wants for the trans-

portation of its ore. Five teams are now at work along the long 10 miles of wagon road connecting the mill with the landing on Kootenay Lake and about a car daily is being sent to the Trail smelter. Formerly only two teams could be obtained.

Notice has been gazetted of official approval of the change of the corporate name of the company known as "The British American Dredging Company, Limited," to that of the "British Columbia Electric Mining Company, Limited."

The New Imperial Mines, Limited, is the name of a company organized at Revelstoke for the purpose of holding a group of mineral claims on Warren Creek, a tributary of Columbia River. The property is in the Golden mining division. The authorized capital of the company is \$150,000. The directors are E. A. Bradley, G. S. McCarter (secretary-treasurer), A. McRea, and A. M. Pinkham, all of Revelstoke, and O. D. Hoar of Golden. The British American Copper Mines and Smelting Company had an option on the whole of the New Imperial Mines company's stock, on which it has made the larger part of the payments provided for, the balance being due early next year.

The Idaho and Alamo silver-lead mines, situated near Three Forks, Slocan, are being offered on lease, the general terms being 20 per cent. of net smelter returns. The property was a large producer some years ago. It is owned by the Idaho-Alamo Consolidated Mines, Limited, represented in British Columbia by R. Roberts, whose address is now Greenwood, Boundary district. An aerial tramway connects the mines with the company's concentrating mill, the latter being alongside the Sandon-Nakusp railway.

Articles of incorporation for the Maple Leaf Mining Company have been filed with the auditor of Spokane county. The company is capitalized at \$200,000, with officers as follows: Alfred Coolidge, president; D. M. Drummheller, vice-president; Aaron Kuhn, treasurer; Charles P. Lund, secretary, and E. Dempsey, manager. Coal properties near Bellevue, southwest Alberta, have been purchased by the company from Davenport, Payne & Co., originally of Spokane, now located at Aberdeen, Washington, U.S.A. Mr. Lund said: We have \$60,000 available for the development work of 700 acres of lands, and plan to begin work immediately. We have sent Mr. Dempsey to the property with a civil engineer to lay out lines. Machinery is now en route to the mine. Within 60 days we will be shipping coal.

It is planned to ship some high-grade ore from the Lightning Peak Gold Mining Company's claims as soon as there shall be sufficient snow on the ground to allow of rawhiding to Fire Valley landing, Arrow Lake. The company's property is situated at the extreme head of the west branch of the north fork of Kettle River and is distant about 70 miles from Grand Forks.

The first general meeting of the Portland Canal Mining and Development Company was held at Duncan on August 17. This company is developing a group of claims at Portland Canal. T. A. Wood, the managing director, in the course of a few remarks congratulated the shareholders on the very favourable showings in values and ore, and stated that work done on these claims up to date was very satisfactory. Seven men are now employed in charge of W. Beaton and work will be continued as long as the season shall permit. A contract has been let for development on the Gipsy, one of the company's mineral claims. R. Angus of Victoria was elected a director of the company.

Frederick Charles Elliott, barrister, of Trout Lake, B.C., has been appointed the new attorney of the Reward Gold and Silver Mining Company, Limited, the head and registered office of which has been removed from Ferguson to Trout Lake. This company holds a large group of mineral claims in the vicinity of Ferguson, Lardeau district. Its mining operations to date have been chiefly the driving of a tunnel, now in about 1,200 ft., with the object of intersecting at considerable depth several lodes that outcrop on the surface of the mountain into which the tunnel is being driven at the lowest level practicable for doing this work.

STOUT & CO. LTD.—Head office at 100, Queen St. W., Toronto, Ont. Capital, \$1,000,000, divided into 1,000,000 shares of \$1 each. Head office in British Columbia at Rossland. Attorney, Francis C. Armstrong, real estate broker, Rossland.

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REGISTRATION OF EXTRA-PROVINCIAL COMPANIES.

- B. C. Standard Mining and Milling Company, Limited.**—Head office at Spokane, Washington, U.S.A. Capital, \$250,000, divided into 1,000,000 shares of 25 cents each. Head office in British Columbia at Rossland. Attorney, Francis C. Armstrong, real estate broker, Rossland.
- Morning Bell Copper Mining and Smelting Company.**—Head office at Spokane, Washington, U.S.A. Capital, \$250,000, divided into 1,000,000 shares of 25 cents each. Head office in British Columbia at Creston. Attorney, O. J. Wigen, fruit and produce rancher, Creston.
- Elsie Huns Copper Mining and Development Company, Limited.**—Head office at Bonner's Ferry, Idaho, U.S.A. Capital, \$500,000, divided into 500,000 shares of \$1 each. Head office in British Columbia at Windell. Attorney, O. J. Wigen, farmer, Windell.
- Slough Creek, Limited.**—Head office in England. Capital, £200,000, divided into 1,000,000 of four shillings each. Head office in British Columbia at Van Winkle, Cariboo. Attorney, John Hopp, mine owner, Van Winkle.
- Snowdrift Gold Mining Company, Limited.**—Head office at Spokane, Washington, U.S.A. Capital, \$12,500, divided into 1,250,000 shares of one cent each. Head office in British Columbia at Koch's Siding. Attorney, Noah Eastman, lumberman, Koch's Siding.
- Trans-Continental Exploration Syndicate, Limited.**—Head office at Ottawa, Ontario. Capital, \$100,000, divided into 1,000 shares of \$100 each. Head office in British Columbia, at Vancouver. Attorney, George Henry Cowan, barrister, Vancouver.

MACHINERY AND CONSTRUCTION NOTES.

The Canadian Rand Company, Limited, have received orders for three 6x10 compressed air locomotives for early delivery at Crow's Nest Pass coal mines—one at Michel and two at Coleman. These locomotives are about 30 h.p. each.

Peacock Brothers, engineers, of Montreal, Quebec, have sold to the Mond Nickel Company, Sudbury, Ontario, two Hadfield's 20x10-in. patent stone breakers, of similar make to those the same agents recently sold for use at the Oro Denoro mine, Boundary district of British Columbia, and the Le Roi No. 2 company's mines at Rossland. Peacock Brothers are sole Canadian representatives of Hadfield's Steel Foundry Company, Limited, of Sheffield, England, makers of rock breakers and other special steel manufactures.

A new brick boiler house at No. 8 fan, Michel colliery, is about completed.

The installation of a large ore crusher at the Granby Company's Curlew mine in Phoenix camp is in hand.

The Kootenay Engineering Works, Nelson, has been awarded the contract for the manufacture and construction of an aerial tramway, double continuous rope and 5,600 ft. in length, from the Hewitt mine to the Wakefield concen-

tration plant. An aerial tramway is being constructed from the Eureka distance of about 5,000 ft.

number of miners' cottages at Coleman, southwest Alberta. It is also erecting a big wash-house at its coal mine there, covering the larry tracks from mine to tipples, and doing other construction work.

A railway construction camp has been established on the extension of the Crow's Nest Southern Railway, near Michel, at the rock cut a little below the coke ovens. Grading is in progress at Elk River.

At Hosmer, the Canadian Pacific Railway Company's town along the Crow's Nest Railway, construction work is being pushed. Some 200 men are at work in the railway yards, and W. P. Tierney, who has the contract for construction of the branch line from Hosmer station to the Pacific Coal Company's coal mines and coke ovens, has been moving in his grading plant and equipment from the Boundary country where he has finished his contract on the Kettle Valley line.

Local newspapers state that the Dominion Copper Company has decided to replace the two hand-fed blast furnaces at its smelter at Boundary Falls, Boundary district, with one large furnace to be equipped for mechanical feeding. The company already has one large furnace of this description installed; when the second shall have been completed the treatment capacity of the smelter will be about 1,400 tons of ore per diem. The intended further enlargement of the works to a daily capacity of 3,000 tons has been reported in

TRADE NOTES AND CATALOGUES.

Mussens Limited, of Montreal, have issued Bulletin No. 19, which deals with rock drill steel. This firm carries stocks of steel at Montreal and at Nelson, B.C., manufactured by Walter Spencer & Co., Ltd., Sheffield, England, which steel is particularly suitable for mining and contractors' work where expert blacksmiths are not obtainable. Another circular gives tables of dimensions, etc., of railway, warehouse and other styles of hand trucks. On another page of this number of the MINING RECORD the same firm advertises Norton Jacks, of which 50 styles are made, from 8 to 70 tons capacity. An illustrated catalogue of these jacks is obtainable on application.

From the Jeffrey Manufacturing Company, of Columbus, Ohio, U.S.A., has been received Catalogue 69A, Jeffrey Screens, in which is illustrated every type of screen this company manufactures that will be of interest to its customers and to prospective buyers generally. The illustrations are clear and well printed. Those requiring fuller data will be supplied if they write for it. A few pages at the end of this catalogue illustrate Jeffrey Standard and Special Chains, Conveying and Elevating Machinery, Crushing Machines, Grab Buckets, Coal Cutters, Electric Locomotives, etc.

PATENT CEMENT SPREADER

A Canadian patent has been received through the agency of Rowland Britain, patent attorney of Vancouver, granted to Isaac Hewitt, of Victoria, on a machine for spreading or surfacing cement in making cement floor or sidewalks. The device consists simply of a framework mounted on flanged wheels, to run on the curb or dividing border of the sidewalk or section of floor. Suspended from the frame is a weighted beam which takes its bearing on the borders and is dragged over them as the vehicle is moved forward, a reciprocating lateral movement, being imparted to the beam from one of the axles of the vehicle. The spreader members forwardly project from the front face of the beam, which distributes and surfaces the cement, which is deposited in front of it.

BOOKS, ETC., RECEIVED.

California State Mining Bureau.—Bulletin No. 46, "General Index to Publications of the California State Mining Bureau," compiled by Charles G. Yale and issued by Lewis E. Aubury, state mineralogist. An appendix gives interesting information concerning the California State Mining Bureau, mineral statistics, etc. Pages, 54; illustrated; bound in cloth. Price 30 cents, postage 6 cents.

Columbia University, New York City.—The "School of Mines Quarterly." Vol. XXVIII, No. 4.

Illinois Bureau of Labour.—"Thirteenth Biennial Report of the Bureau of Labour Statistics of the State of Illinois." Prepared by David Ross, secretary. Part I is a presentation of the statistics of manufactures in Illinois; Part II is devoted to a consideration of the working time, earnings and general home conditions of coal miners and others employed in and around the mines of Illinois. Pages, 665.

Michigan College of Mines.—"Year Book of the Michigan College of Mines, 1906-1907." This book contains announcement of the courses for 1907-8; also a general statement concerning the college, its advantages, management, faculty, regulations for admission, departments of instruction, and much other information relative to the institution, which was established in 1885. Prospective students will find it interesting and instructive.

United States Geological Survey.—

Bulletin No. 287, "The Juneau Gold Belt, Alaska," by Arthur C. Spencer; and "A Reconnaissance of Admiralty Island, Alaska," by Charles Will Wright. Pages, 154; illustrated with maps, diagrams and half-tones.

Bulletin No. 314, "Report on Progress of Investigations of Mineral Resources of Alaska in 1906." By Alfred Brooks and others. Pages, 226; illustrated.

Bulletin No. 315, "Contributions to Economic Geology, 1906." Part I.—Metals and Non-Metals, except Fuels. S. F. Emmons and E. C. Eckel, geologists in charge. Pages, 489; with several sketch maps.

BOOK REVIEWED.

Dredging for Gold in California, by D'Arcy Weatherbe, member of the Canadian Society of Civil Engineers. 214 pages, 6x9 in., illustrated. Published by the *Mining and Scientific Press*, San Francisco, California. Cloth, \$4.

This is an excellent treatise prepared by a practical man. Mr. Weatherbe is a civil engineer by training; he devoted the greater part of the year to a careful study of dredging operations in California and secured a large mass of valuable data and photographs. As he is not connected with any mining company or manufacturer of machinery, his expressions of opinion may be taken as being without prejudice. The result of his work is a trustworthy and unbiased description of dredging, and this by a thoroughly capable writer. The book is full of useful hints and is freely illustrated with reproductions of drawings and photographs, of which there are more than a hundred. Entirely new material comprises quite two-thirds of the book. Included in the appendix are contributions by several well-known authorities, which, partaking of the nature of an exchange of views, widen the field reviewed and add to the value of the book.

The scope of the work may be gathered from the following table of contents: I. Introductory. II. Prospecting Dredging Ground. III. Dredging Machines. IV. Operation. V. The Metallurgy of Dredging. VI. Costs. VII. The Horticultural Question. VIII. General. IX. Appendix. This last contains excerpts from the *Mining and Scientific Press*, including editorials on Gold Dredging and Sectional Dredging Machinery, respectively, and discussion on Gold Dredging by Messrs. J. H. Curle, G. L. Holmes, C. W. Purington and D'Arcy Weatherbe, all well qualified to deal with this subject. Some data relative to cost of dredging is also quoted.

Altogether Mr. Weatherbe's book may be regarded as the first on this subject written at first hand by a thoroughly competent man, consequently there need be no hesitation in recommending it highly to those interested in this important branch of gold-mining practice.

COAL MINING NOTES.

J. F. Ritchie, formerly coal inspector for the Canadian Pacific Railway Company in Alberta, has been transferred to Hosmer, Crow's Nest Pass, B.C., where he will be time-keeper and supply man at the coal mine the Pacific Coal Company is opening there.

On September 12 the *Frank Paper* published the following paragraph: "The negotiations pending last week between the Hilcrest Coal Company and the United Mine Workers of America, looking to an agreement between the company and the miners, have come to a definite end and it has been determined to ask for a government commission under the Industrial Disputes Investigation Act. F. H. Sherman has been nominated as the representative of the men on the commission." The Hilcrest mine is as yet a comparatively small mine situated near Frank, southwest Alberta.

A correspondent of the *Fernie Free Press* states that the Vancouver Coal and Oil Company has some prospectors investigating a find of high-grade coal near Morrissey; also that "miners are coming and going every day in connection with the work at Carbonado and altogether the outlook for Morrissey is brighter than for a long time past." The Crow's Nest Pass Coal Company is again doing some work at its Carbonado colliery, which is on Morrissey Creek. The mines here and 240 coke ovens had been shut down since the early part of 1905.

Employees of the Crow's Nest Pass Coal Company have just been paid their monthly wages, states a September press despatch. At Fernie and at Coal Creek the assembled workmen were paid approximately \$119,000; at Michel the men were paid \$67,000. Because only development work is now being done at the mines at Morrissey, the payroll there has not assumed large proportions, only about \$3,000 having been paid the employees in those mines. Altogether the foregoing payments paid make a total of \$189,000 paid by the Crow's Nest Company for labour during the month of August.

Good progress is being made with the development of the Canadian Pacific Railway Company's coal mine at Hosmer, Crow's Nest Pass.

Mine buildings are being erected near Bellevue, southwest Alberta, for the Maple Leaf Coal Company, which is installing a small power plant to facilitate the driving of a rock tunnel planned to cross-cut several seams of coal.

The output of coal from the Crow's Nest Pass Coal Company's collieries for the week ended September 20 was 21,905 tons, or a daily average of 3,651 tons. For the corresponding week of 1906 the daily average was 3,264 tons. For the week ended September 27 the total was 19,439 tons, an average of 3,240 tons per day.

On September 24 a new record for one day's output at the Western Fuel Company's colliery, Nanaimo district, was made. No. 1 mine produced 1,260 tons and Northfield 953 tons, a total of 2,213 tons.

The *Fernie Free Press* states that the six coke ovens lately built at the Pacific Coal Company's colliery, Hosmer, "are turning out a fine line of coke and giving every satisfaction to the management of the mines."

The Nicola Coal and Coke Company, which now has railway transportation facilities, the spur to its coal mine having been completed, has offered to supply coal to Vernon. The *Vernon News* says: "The rate previously quoted was \$7.50 per ton f.o.b. Vernon."

The Canadian-American Coal and Coke Company, Frank, southwest Alberta, mined and sold 143,605 tons of coal during its last fiscal year. As the mine was worked 234 days the average production was 613 tons of coal per day.

MINING MEN AND AFFAIRS

E. O. Hart, now of Yukon, recently made a trip to Dawson, Yukon.

J. M. Hirth, manager of the Ross Mines and Milling Company, just returned from Seattle. He was on his return to Seattle. He will be away to Spokane.

G. O. Bennett, formerly of here, is now at Seattle. He is leaving for Vancouver Island for a month or two looking after his business interests there.

J. Cuthbert Welch, superintendent of the Alaska Copper Company's smelter at Coppermount, southeast Alaska, was in Vancouver lately and afterwards returned North.

Prof. J. C. Gwillim of the Kingston School of Mines, has returned from Vancouver Island to Ontario. *En route* he visited the various mining localities.

W. A. Calder is working under lease the Lightning Peak Gold Mining Company's property situated in the extreme northern part of Grand Forks mining division.

Prof. T. L. Walker, of Toronto University, was in the Kootenay district early in September collecting specimens for the mineral section of the university museum.

A. Fournier is manager of the Silver Star Mining Company, owning the Cork mine and concentrating mill on the south fork of Kaslo Creek, Ainsworth mining division.

Andrew G. Larson, of Rossland, superintendent of the Le Roi mine, is on a month's holiday trip through Colorado, Utah, and other mining states.

D. B. Dowling has not yet resigned from the Geological Survey of Canada, as previously stated he had, but is on leave of absence.

J. J. Warren, of Toronto, Ontario, managing director of the White Bear Mining Company, was at the company's mine at Rossland late in September.

H. P. Dickinson, of Rossland, representative in southeastern British Columbia of the Giant Powder Company, was on the coast early in September.

J. B. Hobson, manager in British Columbia for the Cariboo Gold Mining Company, has returned to Bullion, Quesnel Forks, after a short visit to his home at Victoria.

Queen's University, Kingston, Ontario, has decided to confer the degree of LL.D. at its autumn convocation on A. P. Low, deputy minister of mines, Ottawa.

Frank Loring, formerly of Rossland and Spokane, has resigned as consulting engineer to the owners of the Trethewey mine in Cobalt district, Northern Ontario.

Chas. M. Campbell, chief of the engineering staff of the Granby Consolidated Mining, Smelting and Power Company, has returned to Phoenix from a trip to Denver, Colorado.

R. H. Stewart, mine manager for the Consolidated Mining and Smelting Company of Canada, has returned to Rossland from a visit to Eastern Canada.

W. F. DuBois, superintendent of the Arlington mine on Springer Creek, Slovan City mining division, is doing some diamond drilling on that property.

Neil McL. Curran, manager of the North Star mine in East Kootenay, lately made a trip over the Crow's Nest railway to Medicine Hat and return.

N. O. Lawton, general manager for the Brown Alaska Company, who has been in Seattle on business, has returned to southeast Alaska.

A. A. Wakefield has retired from the management of the Brown Alaska Company's Outsiders mine near Maple Bay, Portland Canal.

R. F. Tolmie, deputy minister of mines, visited the Boundary and Kootenay districts recently to obtain information for a report to the Government on the coke shortage situation.

Richard Russell, manager of the Stenwinder Gold and Coal Mining Company, of Fairview, Osoyoos mining division, has

returned to the Okanagan from a trip East in the interests of his company.

W. G. Trethewey of Cobalt, northern Ontario, is reported to be the manager of the Trethewey mine in northern British Columbia.

D. D. Cairnes of the Geological Survey branch of the Dominion department of mines, who spent this year's field-work season in Yukon Territory, came south at the end of September on his way back to Ottawa.

Horace V. Winchell, chief geologist for the Great Northern Railway Company, spent a few days in Nicola Valley during the first half of September and proceeded thence through the Similkameen on his return to the United States.

J. M. Turnbull, of Trail, mining engineer for the Consolidated Mining and Smelting Company of Canada was married to Miss Jarvis on September 26 at Owen Sound, Ontario.

H. Hayman Claudet, of Claudet & Wynne, mining engineers and assayers, was married at Rossland on September 4 to Miss Helen Alice Margaret Falding, youngest daughter of W. H. Faulding, accountant to the Le Roi No. 2, Limited.

H. Mortimer Lamb, secretary of the Canadian Mining Institute, has returned to Montreal from British Columbia. It is stated that as a result of his visit to the Province the number of western members will be nearly doubled.

O. B. Rombauer has suspended operations at the Maggie mine in the Ashcroft district and returned to Butte, Montana, U.S.A. Several years ago Mr. Rombauer was chief chemist and assayer at the smelter at Crofton, Vancouver Island.

Jules Labarthe, manager of the Consolidated Mining and Smelting Company of Canada's smelting works and refinery at Trail, left that town in September for Denver, Colorado, U.S.A., on a month's vacation.

W. C. Thomas, of Boundary Falls, general manager of the Dominion Copper Company, was in the Crow's Nest Pass district early in September in connection with coke supply matters.

Chas. Camsell has closed his field-work for the season in connection with his examination of the Similkameen country for the Geological Survey of Canada, and will shortly leave British Columbia for Ottawa.

F. G. Grosvenor, for some time past head chemist and assayer for the Hall Mining and Smelting Company, Nelson, has severed his connection with that company, and intends to spend the winter in England.

Gilbert Mahon, now of London, England, is on a visit to British Columbia. Ten years ago he was engaged in mining engineering work in Rossland camp, and later was manager of the Jewel mine in the Boundary district.

Norman Carmichael of the Arizona Copper Company, was in San Francisco from Morenci, Arizona, U.S.A., early in September. Previous to going to Arizona Mr. Carmichael was in charge of mines in the Nelson district, British Columbia.

A. B. W. Hodges, of Grand Forks, Boundary district, resident manager for the Granby Consolidated Mining, Smelting and Power Company, was in Victoria about the second week in September, when he discussed with members of the Provincial Government the coke shortage question.

Rienzi W. Macfarlane, who some years ago left the Boundary district for Malay and later was manager in Mexico for the Cherokee Goldfields, Limited, has resigned that position. He is now in England, whence he went from Mexico on a vacation.

Arthur Hickling, one of the directors of the Vermilion Forks Mining and Development Company, Limited, owning property at and about Princeton, Similkameen, is in the Province, having recently arrived from England on one of his periodical visits.

Dr. Henry M. Ami, of the Geological Survey of Canada, and Dr. Frank D. Adams, professor of geology at McGill University, Montreal, Quebec, are Canadian delegates to the centenary meeting of the Geological Society in London, England.

Dr. H. S. Poole, of Halifax, Nova Scotia, who some time since spent several months on Vancouver Island, obtaining information concerning its coal measures, will shortly proceed to England for a stay in that country of six months or longer.

Jay P. Graves, of Spokane, Washington, U.S.A., who recently joined the directorate of the Crow's Nest Pass Coal Company as representative of the Granby Company's interests, visited the former company's collieries in the Crow's Nest Pass early in September.

Col. Joshua Wright of Ottawa, Ontario, died in that city on September 6. For several years he was actively connected with the 43rd Mining and Milling Company which was engaged in hydraulic gold mining in the Omineca section of Cassiar district, in this Province.

R. W. Brock and W. H. Boyd, of the Geological Survey of Canada, after having spent the summer in geological work in the Lardeau district, recently proceeded to Rossland to there finish the structural survey of that camp in which they were engaged during the field-work seasons of the years 1905 and 1906.

W. J. Elmendorf has returned to Whitehorse copper camp in southern Yukon, from Spokane. He will shortly proceed to the Bear River section of the Portland Canal country to examine and report upon the mining property in that locality owned by the Portland Canal Mining and Development Company of Duncans, Vancouver Island.

Fukunosoke Yamada, mining engineer Furukana Mining Company, of Tokio, Japan, is in British Columbia, the Nelson Canadian states, to study methods of mining and smelting. Mr. Yamada is also engineer for the Ikeda mines on Moresby Island of the Queen Charlotte group, in British Columbia.

T. H. Trethewey, formerly manager of the La Planta mine on Kokanee Creek, Nelson mining division, has returned to the Kootenay from Port Arthur, Ontario, where is situated the head office of the La Plata Mines Company, Limited. He is now interested in an Albertan coal mining enterprise.

Alexander Hill, of Hill & Stewart, consulting engineers to the Le Roi No. 2, Limited, has returned to England after having paid a visit of inspection to the company's mines at Rossland and to the Vancouver Group silver-lead mine, in the Silverton section of the Slocan, which the company is working under option of purchase.

Ernest Underwood, chief engineer at the deep-drift mine at Slough Creek, Cariboo, while disconnecting some steam pipes in the shaft slipped from the loop in the rope suspending him and falling to the bottom of the shaft, more than 200 ft. down, was instantly killed. He was an Englishman, 32 years of age and unmarried.

H. H. Claudet of Rossland, representative of the Elmore vacuum oil process, lately proceeded to the Giant mine, Golden district, where a plant to treat ore by this process is to be installed. Excellent concentration results are reported from other countries where vacuum oil plants have been in operation for some time.

Herbert Carmichael, provincial assayer, has returned to Victoria after having been engaged for several months in gathering information relative to the Alberni district. It is expected the Provincial Bureau of Mines will shortly publish a bulletin giving the results of the work done in the Alberni mining division by Mr. Carmichael and assistants; also a map to accompany this report.

G. G. S. Lindsey, managing director of the Crow's Nest Pass Coal Mining Company, paid a brief visit to Victoria and Vancouver during the latter part of September. He returned to Fernie via Nelson, where, together with the managers of the Le Roi, British Columbia Copper, and Gran-

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by companies, but the Province has the right to take the land in connection with the same for public use.

George Wilkins, who was in charge of the construction and building of the new smelter at the British Columbia company's smelting works at Greenwood, B. C., has been appointed by the manager of the Tyee Copper Company's smelter to supervise some addition and improvements to the construction undertaking at Ladysmith.

Anthony J. McMillan, general manager of the Le Roi Mining Company of Rossland, has been in Victoria representing to the Provincial Government the unwisdom of yielding to some clamor for action to prevent coke being shipped from the Crow's Nest Pass collieries to United States smelters, as such a course would result in cutting off the coke supply of the Le Roi Company's smelter, which, though situated close to the International Boundary line, is in the State of Washington.

Dr. W. A. Parks, associate professor of geology at the University of Toronto, Ontario, has been spending a few days in East Kootenay, collecting mineral specimens. He is reported in the local press to have found at the St. Eugene mine and other properties situated in the same district some beautiful specimens of copper glance and pyromorphite, or phosphate of lead. These specimens, he said, were as fine as any he had ever seen, and so far as the latter is concerned, it is the only one of its kind he knew of in Canada.

William Yolen Williams lately again visited the Similkameen country, in the northern part of which prospecting work is being done, according to his directions, on the Independence group of mineral claims which is under bond to his principals, stated to be the Granby Consolidated Mining, Smelting and Power Company, Limited. Mr. Williams after-

going to the California-Giant Mining Company, which is operating in that camp.

W. F. Armstrong, of Heriot Bay, Valdez Island, to be a deputy mining recorder for the Nanaimo mining division with sub-recording office at Heriot Bay.

the Revelstoke, Lardeau and Trout Lake mining divisions, in the place of Frederick Fraser, resigned.

Frederick William Valcan, of Hazelton, Skeena River, to be gold commissioner for the Omineca mining division.

deputy mining recorder for the Fort Steele mining division, with sub-recording office at Marysville, in the place of H. Des Barres, resigned.

Francis Lochbie Leighton, of Vancouver, accountant, has been appointed the new attorney of the Vancouver Engineering Works, Limited, in the place of George A. Walkem.

Herbert Young, of Port Simpson, to be a deputy mining recorder for the Skeena mining division, in the place of Herbert Cecil Flewin, resigned.

John Cartmel, of Atlin, to be acting mining recorder for the Atlin Lake mining division.

John Mathers, of Skidegate, Queen Charlotte Islands, to be a deputy mining recorder for the Skeena mining division, with sub-recording office at Skidegate, in the place of W. H. Dempster, resigned.

There has been a marked increase in the production of natural gas in Canada during the last five years. Official records show the value in 1902 to have been \$105,000; the



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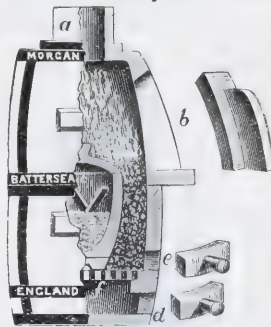
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NOTES AND COMMENTS.

These Kootenay and West Kootenay mines at the
Kootenay mine at Nelson, Washington, and will
be in charge on December 1, in connection with
the company.

During the month ore was being shipped to the
Kootenay mine at Kootenay, British Columbia, and
the Silver Creek mine in northern Lardner.

The Kootenay Ore Company is operating on
sampling works at Kaslo, and according to the
Kootenay mine, has started on a trial run of the
sampler running for three months.

According to report, says the Kootenay mine, the con-
centrator at the Bluebell mine, opposite Ainsworth,
will be shipped from the old mine.

From Fairview, Osoyoos mining division, comes
the report that an important body of well-mineralized
quartz has been encountered on the 200-ft. level of
the mine in that camp of the Stenwinder Gold and
Coal Mining Company.

A consolidation of the Kootenay and West Kootenay
mines held several sittings in connection with the demands
of the employees at the St. Eugene mine and mill,
Moyie, East Kootenay, for higher wages. No de-
cision has yet been reached.

A large tonnage of ore of good grade is stated to
be available on the 400-ft. level of the Idaho mine at
Rossland. This mine is one of several neighbouring
properties owned by the Consolidated Mining and
Smelting Company of Canada.

A correspondent of the London *Mining Journal*,
writing from Frankfurt-on-Main, Germany, says:
Fifteen years ago wolfram ore unsaleable at £20 a
ton, and hardly any production; today, unobtain-
able at £150 a ton, although the world's production
has increased from 1,000 tons in 1890 to 1,000,000 tons
during the last twelve months.

A fine specimen of rich ore has been taken from the Whitewater Deep mine to Kaslo. It does not look big, but weighs about 360 lb. It is intended for an exhibit in the mine manager's office there.

At Moyie, East Kootenay, a local syndicate has bonded the Aurora group of five mineral claims situated on the west side of Moyie Lake. It is stated that about \$10,000 has already been expended in development and the property is fairly well opened up.

Some copper ore of high grade has been met with in the Victoria mine, near Nelson. It occurs in a cross-cut from the main tunnel and at a depth of 150 ft. below the surface. It is hoped that further development will prove the strike to be an important one.

During October James Finlay, manager of the Sullivan Group mine, East Kootenay, was in Rossland after machinery. He reports, said the *Miner*, that 60 men are employed in the Sullivan mine. The output of ore is large and the profits being realized are satisfactory.

Messrs. McGillivray and Erickson, two Slocan miners, won the double-hand rock drilling contests at Sandon, Kaslo, Nelson, and Spokane. At Spokane the contest was almost an international one, but the Slocan men proved themselves the best of five teams competing.

J. Shaw Parker, of Fort Steele, who has spent the past six months prospecting along the Yukon telegraph trail in northern British Columbia, has returned to Cranbrook, says the *Herald*. Mr. Parker speaks highly of the country traversed by him and contemplates another trip to that district next spring.

The decision of the stockholders in the Sullivan Group Mining Company to adopt the recommendation of their mine manager to further develop their mine and determine whether the ore body continues to a depth that will assure them of a considerable supply of ore, before enlarging their smelter, would appear to be a wise one.

Louis Pratt, a well-known Slocan mine manager, has recently been quoted as having said, when in Spokane, Washington, "Sandon is picking up considerably, not as a boom, but a steady, healthy growth is noticeable." The same can be said of the Slocan district as a whole, according to a further observation also attributed to Mr. Pratt.

Under the caption "It is rumoured," the *Slocan Mining Review*, published at Sandon, makes the following suggestive observation: "That a decision in the Star-White case will be handed in on the Day of Judgment." Those familiar with the tedious delays

that have occurred in connection with the litigation alluded to, will appreciate the force of this railleury.

The secretary of the Canadian Mining Institute has reminded members by circular that a number of offices will become vacant next month. He has also invited members to send in nominations for the offices mentioned. Nominations will be closed on January 1, 1908. All nominations must bear the signatures of not less than ten members in good standing.

During the second week in October Boundary smelters together treated 35,500 tons of ore—an average of rather more than 5,000 tons a day. The Granby smelter treated 21,524 tons, the British Columbia Copper Company's works 9,800 tons, and those of the Dominion Copper Company 4,176 tons. The Granby made a new record with its daily average total of 3,075 tons.

A press despatch from Calgary, Alberta, states that the Natural Gas Company, after having bored for 14 months, met with gas at a depth of 2,800 ft. on September 26. While the volume of gas is not yet sufficiently strong to make it of commercial value, the company feels warranted in boring to a greater depth. It is expected that better results will be obtained at about 100 ft. deeper.

The London *Critic* said a few weeks ago: "The Ontario government, convinced that the Cobalt mining district will stand the test of scrutiny, have invited a party of English journalists to pay a visit to the province to ascertain the facts for themselves. The party will sail early in September, so readers of the *Critic* may be prepared for columns of Cobalt optimism in the daily press."

Nothing remains of the old smelter at Pilot Bay, Kootenay Lake, except the smoke stacks. The machinery has all been taken down and removed to the Canadian Metal Company's Blue Bell mine, the timbers of the building being used in construction work at the mine. Even the two brick smoke stacks will not be allowed to remain, says the *Nelson Daily News*, as they will be taken down and the bricks cleaned and used again.

C. H. Low of Montreal, secretary and director of the Payne Mining Company, and N. McL. Curran, manager of the North Star mine, East Kootenay, have completed a thorough inspection of the Payne mine. It is thought the ultimate result of their visit will be the development of the Payne on a scale similar to that of the Rambler. If so the former will later resume its old place among the leading shipping mines of the Slocan.

The new agreement between the Western Fuel Company and its many employees is printed in full

elsewhere in this issue of the *Mining Record*. Both parties to it are to be congratulated upon having come to a mutually satisfactory understanding, and are now on a smaller lengthly contract, as compared with those who have on several occasions, during the last years involved heavy loss to both operators and miners in the Crow's Nest Pass district of the Province.

A press despatch from Dawson states that the Yukon council opened in special session on September 21 to consider the petition of the White Pass and Yukon Railway for permission to build 12 miles of railway from its present line to the Whitehorse copper mines. It is intimated that the company may also seek for a charter to build to the Selkirk soon. The council appointed a committee to prepare favourable recommendations to Ottawa, with a provision for a time limit to build and rates to be regulated.

Three or four years ago, remarks the *Phoenix Pioneer*, it was difficult to find any one in the Boundary who would buy Boundary copper stocks at the then prevailing low prices. How different is the situation today, when most of the buying orders come from the West and from the Boundary, where the oldest residents have increasing confidence in the country and its resources as the years roll on. As the sales are mostly in small lots, it shows also that it is not the men of largest means that are thus showing their faith in the Boundary.

Supt. Frank Little, of the Wellington Colliery Company, who recently returned to Nanaimo from Englishman's River, stated, according to the *Herald*, that work of boring for coal, which was suspended at 1,200 ft. owing to light machinery, will be resumed immediately. As to the outlook for coal mines of value there, Mr. Little did not care to express himself. Work on Nanaimo River is being prosecuted steadily but it will require some time to open up the property there. Two houses have been built there to accommodate workmen.

Edward Baillie has returned to Nelson from a short trip to the Lardeau and says that Poplar camp is looking up a little. Several properties that have been lying idle for the past two or three years are re-starting work and some good finds are being made. Interest, however, chiefly centres in a dredge nearing completion and which should be in operation within the next few weeks. This dredge is the idea of some Philadelphia capitalists and is to be operated on Lardeau River over a stretch of flat river bottom, working its own way along as it removes the gravel.

Elsewhere in this number of the *MINING RECORD* there is printed a copy of the new agreement entered into at the end of September by the Western Fuel Company and its employees. From a press despatch

sent out from Nanaimo shortly afterwards the following has been extracted: A two-year agreement has been made between the mines and men by which the company makes permanent the ten per cent. bonus recently granted by it. Nanaimo mines are now turning out the largest amount of coal in their history and the pay-roll is larger than it had ever before been. Business in all lines is brisk and with the general development on Vancouver Island, prospects for Nanaimo are very bright.

Coal from the Nicola Coal and Coke Company's newly opened coal mine is being delivered to several interior towns along the Canadian Pacific Railway. Although shipments are not yet large, it is gratifying to find that production on a commercial scale is now an accomplished fact. From a recent visitor to the mine competent to express an opinion of value we have assurance that the development work done in opening the mine, and the designing and installation of the surface plant, have been well carried out, and that everything about the property indicates that the enterprise is thoroughly *bona fide* and coal mining here gives abundant promise of eventually developing into an important and profitable industry.

About the middle of September the *Rosland Miner* gave publicity to "street gossip" to the effect that "A. G. Larson, who has been in charge of the practical operation of the Le Roi mine, and under whose direction such good results had been obtained, would not resume his official position." Upon his return from his month's vacation Mr. Larson "positively denied that there was any foundation for the rumour that he had severed his connection with the Le Roi Mining Company, as he was still its mine superintendent and expected to remain as such." It is gratifying to find that once again the attempts of the *Miner* to discredit the management of the Le Roi Mining Company have been ineffectual.

H. N. Galer, manager of the International Coal and Coke Company, has been quoted lately as authority for the statement that 550 men are employed at the company's coal mines at Coleman, southwest Alberta, and that 2,000 to 2,500 tons of coal are being produced daily; further, it is expected the production will soon be increased to 3,000 tons daily. Two seams are being worked and arrangements made to open another seam. Compressed air locomotives are being installed, and other preparations are in hand for increasing production. This colliery's output of coke is, approximately, 250 tons per day. The coke is shipped to the Boundary district, to the smelters of the Dominion Copper Company and British Columbia Copper Company there.

"The movement in capital to this Province is strikingly demonstrated by the activity in connection with coal lands," remarks the *Victoria Colonist*. "The applications for coal licences have been very numer-

ous during the fiscal year just ended and while within the last month the number has somewhat fallen off it is expected that towards the close of the present month it will increase. For coal lands staked in East Kootenay 225 licences were issued; for coal lands in the rest of the Province the number was 183. The revenue to the Province from this source at the rate charged, viz., \$100 per licence, amounted to \$40,800. With the activity in coal lands on Graham and Moresby Islands of the Queen Charlotte group, this amount will be greatly swollen during the present fiscal year."

An Ottawa press despatch says: The members of the staff of experts to take charge of the Canadian mint have arrived from England and are engaged in preparatory work. Coins will be made at or before the end of the year. At least this is the expectation. There will be employed between 70 and 80 men, all of whom, except five members of the staff, will be Canadians. It is understood there are between 400 and 500 applications, the majority probably being from Ottawa. The staff of experts consists of Dr. Bonar, deputy master, of London, England; A. W. Cleave, superintendent, of the Royal Mint, London; Ralph C. P. Pearson, chief assayer, of Melbourne, Australia, who comes from the Royal Mint at Melbourne; John Roe, chief clerk, of the Royal Mint, London; T. Maunsell, foreman melter, of the Royal Mint, London.

In the Big Bend country, north of Revelstoke, the American Mining Company, an organization of Indiana people, has during the season now closing been working about 15 men. The manager, Mr. Vance, has been endeavouring to find the old back channel on French Creek. Coarse gold has been found on bedrock, and the indications of eventual success have been encouraging. On McCullough Creek the hydraulic mining company of that name has been operating with J. D. Sibbald in charge. A slide covered part of the flume and one of the monitors, but notwithstanding the consequent delay, it was hoped it would be practicable to have a clean-up this autumn. The prospects of this company doing well this year have been regarded as promising. There is plenty of gold, but the creek is full of rocks and boulders, and the supply of water has not been sufficient to work to best advantage.

From the Nelson *Daily News* it is learned that the Hewitt Mining Company has purchased from the owners of the Kaslo & Slocan Railway grant about 1,000 acres of land adjoining and surrounding the company's silver-lead mine near Silverton, Slocan Lake district. Its object in purchasing this was to secure for the Hewitt mine timber for mining purposes, also to prevent any trouble arising later about the right of way for the new tramway now being built from the Hewitt No. 6 level to the mill, it has acquired from the Wakefield Mines, Ltd. Mr. Oleott

Payne, treasurer of the company, is now in New York City for the purpose of buying an air compressor which it is expected to install shortly at the mine. It is the intention to put power drills at work immediately on both Nos. 4 and 6 levels so as to connect these with the present faces which are now more than half way through the mountain.

The manager of the MINING RECORD requests subscribers to be good enough to read the memorandum printed at the bottom of the subscription bill forms relating to the exchange charge made by banks on cheques not payable in Victoria. A money order for a small amount payable at par in Victoria costs the sender three cents, while a bank cheque on any place outside of that city costs the MINING RECORD 15 to 25 cents, according to the locality or place on which it is drawn. Where there are hundreds of \$2 amounts coming in, the exchange charges aggregate an appreciably large amount. This seemingly small matter should have the attention of our numerous United States subscribers particularly, for in their cases we would lose nearly 25 per cent. of our subscription price if bank exchange as well as the recently largely increased postage charge (which, unlike most other mining journals affected, we are not requiring our subscribers to pay) were to be paid by us.

When in Vancouver on September 13, G. McIntyre Gibbs, manager of the Dawson branch of the Canadian Bank of Commerce, informed the *News Advertiser* that the output of gold in the Yukon this year will fall considerably short of that of last year, owing to the purchases of claims made by large operators in order to prepare for dredging, as it will take several years to prepare the ground and install the necessary machinery. The orders have been given to big dredge manufacturers and in filling them they will be busy for six or seven years. From the amount of money already invested by the large firms, it is firmly believed when the machinery shall be in full running order that several hundred million dollars will be taken out in a few years. The Guggenheims alone have 20 miles of creeks in their workings, and more precious metal will be taken out of the district than ever before in the history of the country. This year has been a very dry one, and the small output is to some extent accounted for by this fact.

Speaking generally, the press despatches relating to mining sent out from Vancouver are unreliable, while occasionally they grossly exaggerate the position in connection with mineral claims or mining districts. The following statements, made in a despatch from that city under date October 14, should, therefore, not be accepted without question until after they shall have been confirmed as true: News of the discovery of what may prove to be another Klondike, on an unnamed branch of the Findlay River,

was brought to Vancouver today by Inspector A. J. C. McDonald of the R.N.W.M.P., who arrived from the north on the "Prince of Wales." The find consists of one placer ground and that discovered by four Canadian prospectors, headed by Charles Perry, over a year ago. With the melting of the snow and the last spring, operations were resumed. These courses suggest gold, much of it running \$100 to the pan, was being taken out early in the season, when Perry was met by the first October he had seen in three years.

In the ruins of a lecture of a recent visit of Rev. Dr. Campbell, convener of the Presbyterian foreign missions committee for British Columbia, to Cumberland, Vancouver Island, where is situated one of the collieries of the Wellington Colliery Company, Limited, the *Victoria Colonist* said: "As far as his stay in Cumberland for two days would permit, Dr. Campbell enquired in a cursory way into the relations of the coal company to their employees, and was pleased to find that in every way possible the company were doing everything that could reasonably be done in the interest of their men. The white men, Chinese, and Japanese are all well paid; and there would be little trouble at any time were it not for agitators. The Chinese, in whose missionary interest Dr. Campbell visited Cumberland, he found well satisfied, because they had short hours and good pay. He did not hear a word of dissatisfaction among the white men, and such of the company's officers as he saw manifested interest in the safety, health, comfort and wages of the men, both oriental and occidental."

A shipment of two cars of ore from the Hewitt mine near Silvertown, Slovan mining division, to the Consolidated Mining and Smelting Company's smelter at Trail, returned practically four cents per pound net to the shippers. The following figures give details: Gross weight, 80,468 lb.; dry weight, 79,422 lb.; assay, silver 141.90 oz. per ton, lead 6 per cent., zinc 14.7 per cent.; total contents of silver and lead, silver 5,634.99 oz. and lead 4,765 lb.; metal quotations, silver 67 $\frac{3}{4}$ cents per oz. and lead 0.03267 cents per lb.; total value after deduction of 5 per cent. off silver and 10 per cent. off lead, \$3,766.92; freight and treatment charges, \$15.35 per ton (including deduction for excess of fine 0.7, at 50, equal \$3.35 per ton); net value to shippers, \$3,157.36. In round figures results may be shown thus: 40 tons (dry weight) of ore @ \$80 per ton after payment of freight and treatment charges would bring \$3,200, so that \$80 per ton net was about the value of the shipment here noticed. These values are by no means unusual for Hewitt ore, since only five lots, together 97 tons, out of 37 aggregating 727 tons, shipped by M. S. Darr in 1904, averaged more than 100 oz. per ton of silver. The remaining 32 lots ranged from 107 to 320 oz. silver ton, with varying lead values as well.

It is said that as a result of the work of the International boundary survey parties representing Canada and the United States, respectively, a strip of territory 600 ft. wide and several hundred miles long, heretofore regarded as part of the Canadian Yukon, has been shown to properly belong to the United States. The line of demarcation in the north is the 141st meridian, starting from the coast at Mt. St. Elias and crossing the Yukon River at a point about 90 miles below Dawson. The previous location of the line was under the direction of Wm. Ogilvie, a Canadian official, who in 1898 did this work, but accuracy was not then possible. The completion of the telegraph line through the district has facilitated the exact location of the line, which is jointly determined by the first above mentioned survey parties, transfers to the United States the strip of land alluded to. During the field-work season of 1907 the line was determined and a topographical survey made of the country four miles on each side of it, for a distance of about 125 miles south from the Yukon River. It is estimated that it will take three years to complete the work of Mt. St. Elias, after which the delimitation of the line northward from Yukon River will be undertaken and carried as far as it shall be possible for men to proceed with it.

M. & F. Craig, of Brisbin, Pennsylvania, U.S.A., wealthy coal operators in that state, who bought out Capt. Grant's interest in the June group at Quatsino Sound, northwest coast of Vancouver Island, have this season been working the property in conjunction with T. S. Lippy, of Seattle, Washington. It was stated in the summer that there had been placed in the bank \$100,000 for the purpose of developing the property. The plans for work included the construction of about six miles of railway, from the mine to the S. E. arm of the sound. A small (28-ton) narrow-gauge locomotive and 250 tons of 35-lb. steel rails were ordered, and the erection of shipping bunkers had the attention of M. Craig, who was on the ground. At the mine there is on the surface a large quantity of silica-magnetite ore, with a dump of 300 to 400 tons ready for shipment. There can be blasted out from near the surface a large tonnage of ore that will run about 21 $\frac{1}{2}$ per cent. copper and \$2 to \$3 in gold and silver. This can easily be sorted up to average 4 per cent. copper. About 150 ft. under a big open cut, at the end of a 110-ft. tunnel there is about 18 ft. of ore estimated to contain 10 per cent. copper. These results have been met with running up to 18 per cent. copper. With further development this property may be expected to make an excellent showing.

Addressing a large meeting of his constituents at Victoria on September 18, Hon. Wm. Campbell, minister of mines in the Dominion government, said, with respect to the Department of Mines, which had

been organized and placed under his administration, that the premier had been very kind in listening to his representations, and recognized the importance of such a department to this Province—the first mining province in Canada—and had cheerfully assisted him in preparing the act creating the department. That department had been created. It was not yet altogether complete in its organization. They had thus far simply taken those branches formerly of the Interior Department, the Geological Survey and the Mines branch, under a superintendent of mines, and they were going on now and organizing what they believed would be, at an early date, one of the most important departments of the government. There was, he thought, a very great work for a Department of Mines, and particularly in this Province. One of his first acts as minister of mines was to authorize Mr. Lindeman, an expert engineer in iron mining, to come here and explore the known deposits of iron ore on Vancouver Island, for the purpose of making a report to the government, and collecting such information as would be of advantage to those interested in the development of iron to be supplied with, so that, at as early a date as possible, if there be iron deposits of sufficient magnitude, and of the right character, capital may know about them, and be encouraged to come in and develop these great natural resources.

At Cobalt, northern Ontario, on September 5, James McGuire, president of the Cobalt Miners' Union, was charged with violating the "Industrial Disputes Investigation Act" by inciting employees of the Nipissing Mining Company to go out on strike on July 2. T. R. Drummond, manager of the Nipissing mine, gave evidence to the effect that on the date named McGuire went to the mine and addressed the men, whom he told that he (Drummond) had had trouble with men in the West, and that he would work them as hard as he could and give them as little as possible. About 200 of the men went to work at the mine next day, but 100 of them quit, and he had not since had as many men as before the strike. There had not been complaints from the men before the strike, nor had he posted any schedule altering the hours and wages. McGuire was sentenced to six months' imprisonment or a fine of \$500. Notice of appeal was given by counsel for the defence, so judgment in numerous other cases against Miners' Union officials and men was suspended until after the result of the appeal against the magistrate's decision in McGuire's case shall be known. Counsel for the defendants characterized this as the most important law case that had been tried north of Toronto, and stated that in these cases they were going to make the law for the whole of Canada. The chief witness for the prosecution, Mr. Drummond, was formerly general manager for the Dominion Copper Company and resided for some time at Greenwood, in the Boundary district of British Columbia, where he generally got along well with his men.

DEATH OF MR. CLERMONT LIVINGSTON.

CLERMONT LIVINGSTON, general manager of the Tyee Copper Company, Limited, died at his home near Duncan, Vancouver Island, on Sunday evening, October 20, aged 57 years. He was born at Stamford Hill, London, England. Although he never visited South Africa, he became interested in Rand mines in his younger days. Later he arrived in British Columbia from London.

After acquiring several mineral claims on Mt. Sicker, Vancouver Island, Mr. Livingston went to England and there, in the early part of 1900, succeeded in getting the Tyee Copper Company, Limited, organized and registered. He has ever since been local director and resident manager of this company, which has proved, from a financial point of view, one of the most successful of the mines in British Columbia owned by an English company. He was also instrumental in getting the Vancouver Island Mining and Development Company, Ltd., formed in London, and for this company, too, he was local director and manager.

He was energetic in promoting *bona fide* mining and smelting enterprises on Vancouver Island, and in this connection his well-known integrity and rectitude in conducting those he established gained for him general confidence. By his death the mining industry of the Island loses one who thoroughly believed in it himself and succeeded in making others do the same.

Dr. Alfred Thompson, representative of the Yukon in the Dominion House of Commons, intends to endeavour to obtain at the ensuing session of Parliament a number of concessions desired by those engaged in mining in Yukon Territory. He will continue his fight against the collection by the government of a royalty on gold recovered, contending that this impost is a burden prospectors and miners should be relieved of. A lower schedule of fees will also be asked for, the official charges in the Canadian Yukon of \$10 to \$13 for making certain records being considered very illiberal in comparison with fees of \$1 and \$2 in Alaska for filing of each instrument. A cash bonus will be sought for the erection of a copper smelter at Whitehorse, southern Yukon, where several copper mines are being opened and which find ore transportation charges to outside smelters almost prohibitory to profitable production. Further subsidies for the encouragement of the prospecting of new placer and quartz fields will also be asked for, and the necessity for establishing a gold purchasing office at Dawson whenever preparations for minting gold at Ottawa shall be forward enough to warrant this step, will be represented. Additional mail facilities, wireless telegraphy, reduction in money order charges, local examinations for land surveyors, appointment of a pure food commissioner, and other needs will be urged upon the government as well.



THE LATE MR. CLERMONT LIVINGSTON.

Clermont Livingston, general manager of the Vancouver Island Mining and Development Company, Limited, and the Vancouver Island Mining and Development Company, Limited, died at his home near Duncan, Vancouver Island, on Sunday evening, October 20, aged 57 years. He did much to advance the industry of metalliferous mining on Vancouver Island—probably more than any other individual man connected with it. The material service he rendered has been very generally recognized and appreciated. His untimely death is universally deplored.

THE EXPORT OF BRITISH COLUMBIA COAL AND COKE TO THE UNITED STATES.

IT MATTERS NOT in what publication the statements of one of its well-known enemies are printed, the Crow's Nest Pass Coal Company, which is the chief producer of coke in British Columbia, is almost sure to be misrepresented. This time it is in the *Westward Ho! Magazine* (edited by Wm. Blakemore) in which it is stated editorially: "During 1906 more than 50 per cent. of the coal and coke produced in British Columbia was exported to the United States." The following official figures, taken from the "Report of the Minister of Mines" for 1906 will serve to exhibit the actual position in this connection:

	Tons of
	2,240 lb.
Output of collieries for year.....	1,899,076
Taken from stock	17,230
Total	1,916,306
Sold for consumption in Canada.....	681,899
Retailed locally	2,389
Used under colliery boilers.....	170,416
Used in making coke.....	381,773
	1,236,477
Sold for export to U. S.....	679,829
	1,916,306

Allowing for coal made into coke in the proportion of export of the latter to the United States, we find that of the 1,899,076 tons of coal produced in 1906, some 782,143 tons were either exported as coal or used in making coke sent to the United States, while the remaining 1,116,933 tons were used in Canada. The former quantity is by no means 50 per cent. of the total production.

In regard to coke the misrepresentation is much greater. The official figures are:

	Tons of
	2,240 lb.
Output of collieries for year.....	199,227
Taken from stock	11,670
Total	210,897

Of this quantity, 149,193 tons were sold for consumption in Canada and 61,704 tons for export to the United States. From the latter must be deducted 8,304 tons sold for export by the Wellington Colliery Company, Vancouver Island, which was taken from stock on hand at the first of the year. The actual position is, then, that of the 199,227 tons of coke produced in the Province last year only 53,400 tons were exported to the United States. It

will thus be seen that instead of 50 per cent. as so recklessly asserted by Mr. Blakemore, only about 27 per cent. of the year's production was thus disposed of.

The MINING RECORD trusts its readers will excuse its repeated allusions to Wm. Blakemore's statements, or rather misstatements, but they are challenged in the belief that the most effective way to stop his persistent misrepresentations is to show the frequent utter unreliability of his assertions.

THE SULLIVAN MINE, EAST KOOTENAY.

OF THE SULLIVAN MINE, which is situated on Mark Creek, near Kimberley, in the Fort Steele mining division, East Kootenay, James L. Ford, a large stockholder in the Sullivan Group Mining Company, recently said on his return from a visit to the property:

"Working a force of 50 men, both at the smelter and at the mine, the Sullivan is turning out over 100 tons of ore daily, shipping it to the Marysville smelter, and getting gross returns of about \$60,000 monthly for its output.

"The veins opened on the property average 22 ft. in width. Enough ore is in sight and blocked out to keep the smelter and mine running 12 years. Average value of the ore mined runs about 30 per cent. lead. Silver values are not generally prevalent in the ore.

"The third Huntington-Heberlein roaster to be installed at the smelter was completed several days ago. The combined capacity of the roasters is now about 120 tons daily and they are handling an average of 100 tons. After the debt on the bonds shall have been paid, plans will be made for enlarging the smelter plant, installing three additional roasters and other apparatus. A sum of \$100,000 could be easily spent at the smelter and place the company on a dividend-paying basis.

"At the present time the mine is running in the best shape; the work could not be increased at present because of the small capacity of the smelter. The Sweeney interests have been required to hand over their share of the stock, which was secured by the installation of the \$150,000 smelter and to take instead a lien on enough ore to insure payment for the smelter."

At the Spokane Interstate Fair a \$100 silver cup was awarded to the Kootenay district of British Columbia for the best mineral display. The White-water mine in the Slocan district, and the British Columbia Copper Company of Greenwood, Boundary district, were each awarded a cup valued at \$25 for individual mine exhibits. The exhibits of smelter products made by the Consolidated Mining and Smelting Company of Canada, Trail, and the Granby Consolidated Mining, Smelting and Power Company, Grand Forks, obtained diplomas for creditable displays.

THE DUNCAN SECTION OF THE LARDEAU COUNTRY, NORTH ROCHFORD.

Compiled by F. J. J. J.

IN THE DUNCAN DISTRICT there are known to be a great many of mineral claims with large crops of mineral, but their extensive development has been delayed year after year by reason of their being without suitable transportation facilities. Ten years ago some of these properties were noticed

by the then provincial mineralogist, Wm. A. Carlyle, but comparatively little has been done during the intervening period to make this promising section readily accessible. However, since its valuable timber resources, as well as mineral, have attracted the notice of capitalists, it is not unlikely that the beginning of the Provincial Government now in office has made to open up the district by roads and trails will be followed by more energetic efforts to make practicable the utilization of the abundant natural resources above mentioned. In view of this possibility the *MINING RECORD* thinks the time opportune to assist in giving publicity to the promise the district gives as a field for exploration and industrial enterprise.

The Duncan section of the Lardeau Country, especially that part drained by the Duncan River, and the divided summits of highly-tilted sedimentary rocks tower from 7,000 to probably 11,000 ft. in height, harbouring in the high basins and on the divides glaciers and perpetual snow, affording scenic effects of great grandeur and beauty probably unsurpassed anywhere in the Province. The country is generally steep,



Fig. 1. Heart of the Selkirk Mountains, Duncan-Lardeau District, British Columbia.

by the then provincial mineralogist, Wm. A. Carlyle, but comparatively little has been done during the intervening period to make this promising section readily accessible. However, since its valuable timber resources, as well as mineral, have attracted the notice of capitalists, it is not unlikely that the beginning of the Provincial Government now in office has made to open up the district by roads and trails will be followed by more energetic efforts to make practicable the utilization of the abundant natural resources above mentioned. In view of this possibility the *MINING RECORD* thinks the time opportune to assist in giving publicity to the promise the district gives as a field for exploration and industrial enterprise.

In his description of the Trout Lake mining division, as printed in the "Annual Report of the Minister of Mines" for 1897, Mr. Carlyle gave the

leading down into deep, narrow valleys, which are heavily and densely timbered, more particularly in the Lardeau basins, to an elevation of 5,000 to 5,500 ft. above sea level, a condition that so far has compelled most prospecting to be done near the summits, where the rock is more exposed, with the result that the mining work now being done ranges in elevation from 5,000 to 8,000 ft., although now, guided by the known trend, some of the leads are being traced down to much lower elevations, where, in the valleys, they should be found as well, and, probably, as strong, as near the rock-bare summits.

"The under-brush, up to an elevation of about 5,000 ft., is heavy, and little or no feed for horses can be found, except near and above timber line, where it is generally excellent. The country is drained by many creeks and strong streams, which will yet prove of great value for milling and power

purposes, although in the autumn and winter months the amount of water must necessarily be of much less volume than during the rest of the year.

"Altogether, the surmounting of the natural conditions that here obtain will be in nowise greater, in the writer's belief, than those that have been so splendidly overcome in the high mountains of the Slocan, where the apparently inaccessible mines are now being made easily accessible by railways, wagon roads, trails, and the far-spanning aerial tramways. If good mines of high-grade ore are developed, the means for transporting ore to the markets will be supplied, but the mines must be first proved up before others can be expected to supply these means.

"GEOLOGY.

"Trending northwest and southeast, southwest of the Trout Lake and the Lardeau River valley, is the area of the schists, gneisses, and granites, now proving to be mineral-bearing; but to the northeast of this line is a large area of highly-stratified sedimentary rocks that, for a width of 6 to 10 miles, comprises a great thickness of slates, shales, and calcareous schists, with thin beds of quartzite and limestone, also trending northwest and southeast, standing nearly vertical or dipping southwest up to the great belt of marbled limestone, or 'lime dyke,' as it is locally called, to the northeast of which the dip is to the northeast.

"This limestone formation, evidently both over- and underlain by slates, shales, etc., is evidently the apex of a very steep and acute anticline, of which the sharp crags and peaks of limestone form such a marked feature for miles through this region, or else it has been elevated to its present position along a line of faulting, although at the head of Hall Creek, near the Wagner group of claims, the evidence of a steep anticline seemed conclusive, and the dipping of the formations either way from this apex was most apparent. On the southwest side the line between the lime and slates runs straight for many miles, but more especially on the southwest side, prospectors are at work, although the veins, so far, with some exceptions, have been found in the slate and schist formations, not only near the lime belt but several miles away, as exemplified in the Silver Cup, Great Northern, and other groups, so that a wide extent of country here presents possibilities for the location of veins of pay ore, and already the discoveries so far made have not been localized but widely scattered.

"The limestone that has attracted hither many prospectors and miners who have worked in the great silver mines in the Carboniferous limestones at Leadville, and Aspen, Colorado, and know the great possibility for the deposition of rich orebodies in such a formation, is very solid and highly altered and, as yet known, not traversed and influenced by intrusions of igneous rock, of which very little is seen in the sedimentary rocks of this district, and which in some way was very potent in those parts of Colorado mentioned, in the forming of great orebodies."

THE MINERAL CLAIMS.

From Mr. Carlyle's description of the numerous mineral claims in the Trout Lake mining division the following information relating to those on the Duncan slope has been extracted:

"Wagner Group—This group, or the highest mine in the Province, elevation 8,200 ft., lies on the summit between Cariboo and Hall Creeks, and thence extends southeast down the gulley below the glaciers, across the head of Hall Creek gulch to the summit separating this gulch from that one occupied by the Abbott group and drained by a stream into Haley Creek, Hall and Cariboo Creeks flowing into Duncan Lake, or in the other direction.

"The Selkirks here are very grand—the lofty, craggy peaks towering above gigantic glaciers, while the steep mountain-sides are scoured in places by avalanches or snow-slides, yet near these summits have been made discoveries of silver-galena deposits, especially near or at the line of schists and slates



View on Ferguson Slope of Selkirk Range.

with the great tip-tilted band of marbled limestone or 'lime dyke,' that stands up prominently for many miles with towering, precipitous, naked sides and castellated crests.

"On the Duncan claim on the top of the ridge, at an elevation of over 8,000 ft., a small knob or boss of slate or schists rises from the perpetual snow and ice. A zig-zag trail leads from the tents (elevation 6,500 ft.) up to these glaciers, and then across this solid mass to the tunnel, which here enters and passes along a smooth white quartz wall of a large and strong ledge, the outcrop of which runs up and over this knoll. This outcrop consists of a wide mineralized zone of bands of quartz and galena, and irregular bands of slate nearly coincident in strike and dip with that of the country rock. Strike is north 50 deg. west; dip, south 40 deg. west 70 deg.

"There is much barren quartz, but there is also much carrying a good percentage of galena with

good silver values that, under the proper circumstances, may prove good concentrating ore. This zone is 30 to 40 ft. wide of mixed rock matter and ore with bands of clean galena 3 in., to 2 or 3 ft. wide.

"The tunnel follows along the smooth quartz wall with a nearly continuous streak, 2 to 20 in. wide, of clean, fine-grained galena showing in the roof, 100 ft. to the face, and two cross-cuts to the left, 8 ft. long, are still in quartz carrying a very good percentage of galena, a little iron pyrites and zinc blende and tetrahedrite, hence the width of this orebody in the tunnel was not disclosed. Since time of visit a winze has been sunk 50 ft. showing, it is stated, about the same conditions.

"The owners think there are indications of this ledge below the lower limits of the glaciers, but no tests have yet been made to verify this.

Frances Jewell—This claim, Queen Marie, Princess Marie, and Lucille K., lie as the N.E. extension of the Wagner group, and in a 30-ft. tunnel on this claim has been found a vein of quartz, galena (silver-bearing) and grey copper. In the gulch just below the Wagner claims, and on the Queen Marie and Princess Marie, there extends for about 500 ft. a strong vein of banded, coarsely crystalline quartz, 10 to 15 ft. wide, very slightly mineralized with pyrites and galena. Practically no work has been done on this exposure, nor have any values been found, but this may yet prove to be important and



A Glacier in the Selkirk Mountains, Duncan Landing, Duncan, British Columbia.

"The method of working this property and the transport of the ore down to a concentrator will present some unique features, as the workings and aerial tramway will have to be located so as to be safe from snowslides; but much more work is necessary to determine the extent and value of this interesting vein before such are considered.

"This ore will, in every probability, have to be exported *via* Hall Creek and the Duncan River, as the trail from Ferguson, about 24 miles long, is a hard one and climbs over two divides. There is little or no timber upon these mountains except down in the valleys, and fires have burned over a lot of ground.

significant.

"Other Claims—The Laura J. and the Ward lie along the steep face of the slate cliffs parallel to the Wagner vein, and a narrow vein of silver-bearing galena can be traced for a considerable distance, assessment work on which is said to have given very favourable results. Death-on-the-Trail, Little Tommy, Bell Flower, and others, owned by the Duncan-Lardo Mining Company, were recently located on stringers of galena in the slates underlying the limestone of the 'lime dyke.' Assessment work was being done.

"Abbott Group—The Abbott, King William, and Marion lie southeast of the Frances Jewell, in a

large basin drained by Haley Creek. On the Abbott claim there is said to be a small vein of about 20 in. wide of galena high up on the steep side of the 'lime dyke,' to tap which a tunnel was being driven (now in about 300 ft.) until two men were killed in a snowslide, since when no work has been done.

"Bannockburn Group—This property lies up in the high basin east of the 'lime dyke' to the south

(Note—When at Kaslo last autumn the editor of the MINING RECORD was informed by a mining man familiar with the Duncan country that on the Bannockburn group galena had been cut in trenches along a distance of about 175 ft. It had been cut in eight or nine places and varied in width between 2 and 5 ft. Assay values were 60 to 65 per cent. lead, and about 45 oz. silver and \$8 gold to the ton.



Section on Range East of Porcupine Creek, showing Lime Dykes.

"At the head of Gainer Creek the structure is revealed by the lime dykes. The first (most southwesterly) dyke is formed by the outcropping of a limestone band in the southwest limb of an appressed anticline. A subordinate anticline and syncline with the anticlinal arch eroded, the syncline still remaining, forms the second dyke, as shown in the accompanying diagram. A few miles to the southeast, on the ridge east of Cariboo Creek, the minor fold is a syncline and the major anticline is slightly overturned so that the limestone band dips a trifle northward. The northwestern limb of this great fold probably occurs away to the northwest of the West Fork of the Duncan, where a range appears to be composed of limestone."—R. W. Brock in his report on the Lardeau District, *vide* "Summary Report of the Geological Survey Department of Canada for 1903," p. 55.

of about 1,000 ft. above Hall Creek. Three galena veins are reported, but only a few shallow surface cuts have been made to develop. This galena is said to carry medium silver values, one assay returning 35 oz. silver and about \$5 in gold per ton, and 70 per cent. lead.

"Cariboo Creek—Prospectors were busy during the past season up this week, which lies northwesterly from Hall Creek, and important finds were reported on claims staked off on both sides of the 'lime dyke.'"

The lode had been traced fully 4,000 ft., and ore had been encountered wherever a trench had been cut along that distance. It was described as "the biggest surface showing in the country.")

The next following paragraphs have been taken from reports made by R. W. Brock, of the Geological Survey Department of Canada, who spent the greater part of the field-work seasons of 1903 and 1904 in

the Lardeau district. In the course of his report for 1905, Mr. Birch observed:

"PHYSIOGRAPHY.

"The country lies in one of the most rugged and picturesque portions of the Selkirk Mountains. Huge, massive mountains, culminating in lofty craggy peaks, supporting numerous glaciers and perpetual snowfields, are separated by steep-walled, narrow valleys. The mountains are in an early stage of their life history, and are therefore thoroughly Alpine in character. The altitude of the mountains gradually increases going northward and eastward from the head of upper Arrow Lake, from rather more than 8,000 to perhaps 11,000 ft., north and east of the Duncan River.

... the lower Arrow and Duncan. The gradient of the lower part of the valley is usually ... its mouth by the occupying stream. The middle ... of the valley ... a park-like amphitheatre. These valleys dissect the district into a number of mountain ridges, having in general a northwest-southeast trend, with offsetting ridges at right angles. These mountains are big, blocky masses terminating in rugged, narrow, serrated ridges whose even sky-line is relieved in detail by numerous pinnacles and spires. This even sky-line, which is a striking feature in a panoramic view ...



View on the Empire Group at the head of Arrow Lake.

"There are two main longitudinal valleys in this part of the country, which have in general a north and south trend. These are the Columbia and Arrow Lake valley in the west, and the Duncan-Kootenay valley in the east. The valleys tributary to these, in the district examined, depend for their direction largely upon the local structural features of the rocks, which are mostly stratified or schistose, folded in general along northwest and southeast axes, with a vertical system of master-joints at right angles to the direction of the folding. Conforming to this structure, the valleys are northwest and southeast, or at right angles to this, except where influenced by local peculiarities.

"The smaller valleys are deep, narrow and V-

shaped. The larger ones are broad and U-shaped. The gradient of the lower part of the valley is usually ... its mouth by the occupying stream. The middle ... of the valley ... a park-like amphitheatre. These valleys dissect the district into a number of mountain ridges, having in general a northwest-southeast trend, with offsetting ridges at right angles. These mountains are big, blocky masses terminating in rugged, narrow, serrated ridges whose even sky-line is relieved in detail by numerous pinnacles and spires. This even sky-line, which is a striking feature in a panoramic view ...

they approach the valley, but run steeply down to the valley level. The ends of the ridges running into the larger valley have all been truncated."

THE STRATIFIED ROCKS.

Under this head Mr. Brock says, in part: "When metamorphosed, the limestone becomes white and crystallized. Some of these bands form pure, white, fine-grained marble, in hand specimens at least, resembling the fine qualities of marble used for artistic purposes. The limestone beds, which vary in thickness from a few inches to several hundred feet, are distributed somewhat sparingly through the slates and phyllites, except in certain zones. They are more abundant along the northeastern portion of the district examined, where the thickest bed forms the well-known lime dykes. The limestone of the lime

and schists are also silicified in places, and have quartz veins, lenses and stringers developed in them. At several points along the mineralized belts, massive quartzites occur."

MINERAL IN THE LIME DYKE SERIES.

In his notes on the mining geology of the Lardeau Mr. Brock says (in Report for 1903, p. 70) of the "lime dyke" mineral belt: "The lime dyke series of rocks forming a belt along the head waters of the tributaries of the Lardeau, and west fork of the Duncan, is well mineralized, but on account of the altitude and distance from transportation, development has necessarily been slow. Were it not for the metamorphism which some of the rocks have undergone, and the prominence of limestone, there is little difference between the rocks and ores of this belt and



A Miner's Summer Quarters in the Duncan-Lardeau District, British Columbia.

dykes is mostly white and crystalline, but some less altered portions are drab or dark-coloured. In some portions it is replaced partly or wholly by white silica, and quartz stringers form a network through it. These outstanding on account of weathering, make it possible to scale the precipitous peaks which would otherwise be quite inaccessible. As is common in limestone, waterways have been dissolved in it, forming caverns, natural bridges, winzes and tunnel-like openings in which dog-tooth and nail-head spar, concretionary limonite and large masses of concentric, radiated aragonite are developed. The aragonite is of beautiful shades of honey-yellow, green and bluish green, and can be obtained in masses as large as 18x12 in. The slates, phyllites

those of the central mineral belt of the Lardeau. They contain numerous diabase and porphyrite dykes and sheets; bands of green schist are also met with. The rocks are compressed into folds, so that while the strike is fairly constant, the dip varies from north to south. The possible influence of the folding upon the orebodies should be borne in mind in exploiting the ores of this district. Somewhat auriferous silver-lead ores and siderite-bearing quartz veins are found in this belt also."

Again (in Report for 1904, pp. 87-8), Mr. Brock states that: "Mineralization extends along both sides of the 'lime dyke' or to a limited extent in the lime itself. The Wagner claim is situated on the divide between Haley and Cariboo Creeks, west of

the "lime dyke," at an altitude of over 8,000 ft. The workings are on a small knob above a glacier which has to be crossed to reach the mine. The mine is situated in corrugated slates with diabase schists. A band of lime, filled with an almost microscopic network of quartz stringers, occurs in the slates of the hanging wall which are contorted and faulted by thrusts on a minute scale. The lower body consists of several veins of quartz which unite into one mass several feet wide which splits up into small veins and stringers. The ore consists of galena with some pyrite and grey copper. The galena is cubical, sometimes fine but mostly coarse, and occurs in masses up to a width of 6 in. Blobs of quartz appear in the galena and, in places, crystals of quartz, up to 1 in. thick and 2 in. long, are imbedded in the ore. The

quartz sometimes, in the absence of an action of water, show characteristic prospecting and development, but until a mine has been developed it is impossible to say that conditions will be necessarily improved. Gold is reported to have been found during the summer in a large pyrite vein on Hall Creek."

In one of his reports Mr. Brock says: "The lime dyke fault may not be pronounced for gold. Numerous quartz veins, similar to those in the gold camps, occur in it under like conditions and it is a possible source of them are gold bearing."

THE KALE KENNEDY JOURNAL

The Kale Kennedy Journal published the following article:



vein quartz is inclined to be drusy and these druses are frequently filled with ore. About 20 ft. to the south is a second vein, 6 in. wide, of massive galena. The workings are said to consist of a tunnel 100 ft. long with a cross-cut and a winze 60 ft. deep. At the time of our visit they were inaccessible on account of snow.

"The Abbott, on the Haley Creek slope, and the Bannockburn, on the Hall Creek side of the 'lime dyke,' have been developed by cross-cuts to tap ore exposed on the surface, but no considerable quantity of ore has been exposed. There are numerous other claims along the southern part of the lime band, but little work more than that required for assessment or Crown-granting has been done. The inaccessibility of this portion of the district and its severe

Col. Ridpath, of Spokane, one of the most prominent mining men in the Pacific Northwest, was a recent visitor to this part of the country. He was amazed at the immense surface showings of the property, and remarked "it is the biggest proposition undeveloped I have ever seen."

The Wagner group is a silver-lead property consisting of the Duncan, Lardo, Princess Marie, Queen Marie, Frances Jewell, and Lucille K. mineral claims and three fractions. They adjoin the Abbott group on the southeast and follow the vein in a northwest direction along the west side of the well-known "great lime dyke."

The work performed on the Wagner before this season, was purely prospective in character. The vein has been exposed by the open cross-cuts, and

small workings on nearly all of the nine claims, and good bodies of ore have been uncovered on each. But most of development was confined to the Duncan claim, which lies near the apex of the range on the north side of Hall Creek.

The principal of this work consisted of driving a 100-ft. tunnel, with a vertical depth at its face of 76 ft. This tunnel is on the southeast slope, and is in and follows the foot-wall of the vein in a northwest course. Two cross-cuts were also driven. No. 1 is at a point 60 ft. from the mouth of the tunnel, and, while only 11 ft. long, shows an ore body 7 ft. wide. A shaft sunk here to depth of 56

could be shipped from the surface showings of the Duncan alone, and all the other claims are reported as equally promising. This is what Col. Ridpath saw during his recent trip through that section.

On the Wagner group, which had been idle for years, operations were resumed some months ago under the management of T. C. Porter of Spokane. In spite of transportation difficulties encountered development is being proceeded with. It is intended to continue work throughout the winter and supplies have been shipped in for this purpose.

Possibly, from the undeveloped mineral point of view, the Hall Creek section is without an equal



Felling Timber in the Duncan-Lardean District, British Columbia

ft. exposed a strong body of galena ore 8 ft. in width. At the back of the main tunnel is cross-cut No. 2, which was driven southwest about 45 ft. It also cut into an 8-ft. body of excellent ore in a gangue of quartz and slate. Average assays of the ore taken from different parts of the Wagner during prospect work, gave returns of 132 oz. of silver and 46 per cent. lead, while the average of six tests yielded \$1.50 in gold.

The surface showing of the Duncan from below the mouth of the tunnel to the top of the range is a most remarkable one, and is seldom equalled either in size or regularity. Ore and quartz, and ore in massive bodies have been exposed by erosion to a width of from 20 to 35 ft., containing more clean ore than concentrating. Even with the little work done it has been estimated that 6,000 tons of ore

in Canada. The surface showings are immense, and without tunnelling would yield thousands of tons of ore. The properties known there have been barely opened, the work on the Wagner group being the most extensive so far. Nearby is the Bannockburn group, which for big surface showings almost rivals the Wagner, while in the same locality is the Red Elephant group, similar in abundant surface showings to its neighbours. The big Abbot group is in the same section, and these are only a few of many that might be named.

The principal, and in fact only, cause for the present neglected state of the Hall Creek district, is lack of transportation. This has caused its known valuable mineral resources to be overlooked in the past, and also has been the reason why so little work has been performed on the big veins. It was no use

in the cost of getting away the nearest point and of smelting, means the process, consequently little beyond a common work to obtain these grades has been done. However, we look for a big change in the future. Our policy of publicity is bearing fruit. The district is coming into prominence, and it is this section of the Duncan Valley that will later be one of the most important factors in the upbuilding of Kootenai.

Still more recently the *Kootenai*, after a representative had paid a flying visit to Hall Creek, published another article, from which the following excerpts have been taken:

The Wagner group is owned by the Wagner Mines, Limited, of Spokane, Washington. There are 18 Crown-granted claims in the group. On six of these only has work of any account been done, although on nearly all of the claims galena ore can be quarried from the surface without much use of powder. Development work on the Frances Jewell, Princess Marie, Queen Marie, Lardo and Duncan, has put enough ore in sight to show them to be mines in so far as ore is concerned.

On the Duncan claim the greatest amount of development has been accomplished. A drift has been run along the hanging-wall for a distance of 100 feet. Cross-cuts from this have been made and a winze sunk and in these the orebodies are as big and important as on the surface. The ore shoot on this claim averages 12 ft. in width and is made up of clean and concentrating ore. Assays of the former have shown 300 oz. silver and 60 per cent. lead. Some 70 samples taken from across the surface at various places, in order to get an average assay, gave returns of 15 to 19 per cent. lead and 28 to 31 oz. silver. It can be easily seen that concentration will bring this up to a high-grade shipping product. There will be no problem out of the ordinary to deal with in concentrating these ores. It is expected that they will concentrate about 4 to 1.

On the Princess Marie and Queen Marie, the creek has stripped the ledge for a distance of 800 ft., exposing a body of concentrating ore 15 to 25 ft. wide for the whole distance. The ledge matter is the usual white quartz. The ledge lies within the slate dyke. The ore shoots crop out at intervals and in places appear to be almost continuous. It is stated by those who have been over the ground, that the whole of the slate dyke, for a distance of 18 miles, has similar remarkable ore showings.

The Abbot group lies in the green schist formation, while the Bannockburn is in the lime. These two groups run parallel with the Wagner, but at a higher altitude, the erosion of the soft slate leaving the lime and slate as parallel ridges on either side.

The Wagner and St. Eugene were both sampled ten years ago by the late Maurice A. Bucke, M.E., then resident at Kaslo, who was on the lookout for a big silver-lead property for Eastern capitalists. He

expressed to Eugene of the West the need of railway transportation to the Duncan and the construction of the Crow's Nest railway a year later, gave the Wagner property the attention. And the St. Eugene is the greatest silver-lead producer in Canada today.

Well, as the Wagner District comes to be defined largely to the building of trails and preparation for some active mining next summer, when it is expected enough ore will be shipped to pay all expenses. The head office will be located in Kaslo, supplies bought here and this city made the base of subsequent operations which will shortly assume immense proportions. We have the best of authority for stating that the Great Northern officials will place the SS. Argenta on Howser Lake next fall, which step, so long delayed will go a long way towards solving the transportation problem.

The Consolidated Mining and Smelting Company of British Columbia has been organized to consolidate the following companies: Old Gold Quartz and Placer Mining Company, Primrose Gold Mining Company, Mountain Lion Mining Company, Treadwell Gold Mines Company of British Columbia, and Lardeau-Duncan Gold, Silver and Copper Mining Company. Judge J. M. Miller of Trout Lake City had long been endeavouring to bring about this consolidation, and when met in Nelson last autumn he informed the editor of the *MINING RECORD* that he was then about completing the consolidation and that the company had done a considerable amount of work on mineral claims situated at the head of the west fork of Duncan River. He expressed the opinion that no part of British Columbia not yet provided with transportation facilities offers so large a tonnage as does the Duncan country. The substance of his further remarks on that occasion is contained in the following:

The first need of the Duncan country is transportation. Some years ago the J. J. Hill (Great Northern Railway) interests graded 12½ miles of road bed from the head of Kootenay Lake to the foot of Howser Lake. The latter lake and Duncan River are navigable together about 28 miles from the end of the grading north to Hall's Landing. From the Landing to the west fork of Duncan River, about 18 miles, a one per cent. grade can be obtained for a railway; thence up the west fork for about 18 miles to the head of the lake, a one per cent. grade can be obtained.

The district has immense natural resources in timber and minerals. Its timber is probably the finest in size and heaviest in growth to be found anywhere in the big Kootenay country. It is practically all taken up and held by McGoldrick & Company (of Minneapolis, Minnesota, and Spokane, Washington) and several others. McGoldrick & Company have "corrallled" timber roughly estimated

at 250,000,000 ft. The timber is taken up for 22 miles above the west fork. But before the timber can be turned to commercial account wagon roads or railways must be built to admit of logging and saw-mill plant and machinery being taken in and to provide transportation facilities for shipping lumber. The time seems to be ripe for establishing mills and utilizing these enormous timber resources.

As to the mineral resources of this section—ore could be shipped today from 15 to 20 mines if there were suitable transportation facilities to allow of its being done. There are immense orebodies awaiting development in the parts of the district that have been partly prospected, but only the west side of the Duncan has had any attention, and that has simply been run over. On the east side of the river much of the country has not been prospected at all; what has been examined shows the occurrence of large orebodies carrying good values. Nearly all the properties yet prospected in the Duncan country run well in gold, but the principal values are in silver, lead and zinc, with a fair percentage of copper. Recently there have been reports of discoveries of gold-bearing



Pack Train Crossing a Glacier in the Selkirk.

ore; one in particular was of lode 6 to 23 ft. in width, traced across two claims, assays of ore from which returned \$14 to \$28 in gold.

While considerable work has been done on a number of mining properties only small quantities of ore have been shipped, the expense of "packing" it over the mountain trails having been too great to allow of more being sent out. When suitable transportation shall have been provided, though, the Duncan district will prove one of the finest mineral sections in British Columbia.

A railway survey was made up the west fork of the Duncan some time ago by Minneapolis capitalists and it is understood they are looking into the position with a view to arranging to build a railway there.

Access to the district at present is by trail 18 miles from Hall's Landing to the west fork of the Duncan, or by trail from Ferguson up the north fork of

Lardo Creek and over a divide 4,000 ft. high—a distance of 9 or 10 miles from Ferguson to the top of the divide and thence 8 miles down to the west fork of the Duncan. This trail passes a number of mining properties, including the Old Gold, Guinea Gold, Consolidated, Comstock, and others, all of which have worked, some extensively. The Old Gold has a large quantity of ore ready to be shipped whenever transportation shall be provided. The Guinea Gold also has considerable ore. From three or four of the properties in this camp small trial shipments of ore have been made to a smelter, and from these values ranging from \$64 to \$146 per ton in gold and silver obtained. Most of the claims are held by prospectors, except those on Hall Creek, and much work has been done in past years, but now they are waiting for transportation to be provided. Only for about three months in the year can prospectors depend upon getting pack-horses over the divide from Ferguson and even then snow has to be crossed in places, so the outlet for the west fork country must be down the Duncan River. At Haley's ranch, Hall's Landing, hay and vegetables are grown. A packing "outfit" is kept here and the horses are generally in excellent condition, the rushes, etc., making good feed. The snow on the Duncan slope is not as heavy by one-half as that on the Lardeau side of the divide.

On some of the claims there are good cabins. Everywhere there are fine water powers available; water runs from the many glaciers the year round all the way down the Duncan, particularly from the "lime dyke." There is plenty of timber for mining. It is a fine game country—bear, goat, caribou, timber wolves, grouse, fool hens, ptarmigan, etc.

The Mount Bischoff Tin Mining Company, Tasmania, recently declared another dividend, of five shillings per share, which makes the amount paid since the inception of the company £175 15s. per share, and a total of £2,406,000.

A published comparative statement of copper exports from the United States during seven months to August 1, last, compiled by the secretary of the New York Metal Exchange, shows that there has been a falling off as compared with the corresponding period of 1906, as under:

In tons of 2,240 lb.		
	1907.	1906.
United Kingdom	10,400	15,867
France	18,409	19,856
Germany	23,346	28,962
Holland	32,982	40,610
Belgium	793	1,268
Austria	4,894	5,976
Italy	4,158	4,465
Russia	746	836
China and Japan	22	1,613
Sundries	1,538	621
Total	97,288	120,074

NEW AGREEMENT BETWEEN WESTERN FUEL COMPANY, LTD., AND ITS MEN.

Satisfactory Outcome of Recent Negotiations.

THE OUTLOOK FOR NANAIMO appears more promising, in regard to its coal mining industry than at any previous period in the history of the important and productive coal mines long worked in the vicinity of that town. During September meetings were held and the situation was carefully considered, with the result that a new agreement was drawn up, voted upon by the company's employees, and, after having received the support of a majority of the men, was signed by representatives of the two parties to it. For a few days the drivers in the mines declined to accept it, contending that they were entitled to higher wages than had been provided for in making up the schedules, but finally they accepted the terms of the agreement and resumed work. The Nanaimo *Herald* published the following on September 29:

Below will be found the new agreement entered into yesterday between the Western Fuel Company and its underground employees to replace the agreement which expires tomorrow, and which will govern conditions in the local mines for the next two years. The agreement was submitted to the men at a mass meeting held on the Green yesterday morning, and was voted on at the court house, with the following result, a two-thirds majority being required to defeat the agreement:

For agreement	461
Against agreement	408
Majority for agreement	53

The main points of difference between the new agreement and the old are that the men are given free transportation to and from Protection Island, and the 10 per cent. bonus they have been receiving for some time is made permanent for the next two years.

In the following table the ten per cent. advance is not added, so to arrive at the correct rate of wages under the new agreement it will be necessary to add ten per cent. to rates as printed herein:

Memorandum of Agreement entered into this thirtieth day of September, A.D., 1907.

Between:

The Western Fuel Company, hereinafter called "The Company," of the first part;

And:

The Employees of the Western Fuel Company, represented by a committee of five elected at a duly called mass meeting held August 24, 1907, hereinafter called "The Men," of the second part.

Witnesseth—That for and in consideration of the several conditions hereinafter mentioned, and the mutual advantages of the parties it is agreed by and between the parties hereto as follows:—

First—The rates, terms and conditions in effect at both Number 1 and Northfield mines, during the

month of September, 1907, shall continue in effect during the term of this agreement, except as herein after provided.

Second—The company agrees to continue the payment of the present bonus of ten per cent.

Third—The company will absorb the expense of operating the Protection Island ferry.

Fourth—The system of double dockage as practised at both Number 1 and Northfield mines shall be continued with penalties for refuse matter as follows:—

No. 1 Mine—Up to and including 50 lb. of refuse per car, double dockage; over 50 lb. and including 100 lb. of refuse per car, confiscation of car; over 100 lb. of refuse per car, dismissal after investigation.

Provided, that any party dismissed may have right of appeal to the superintendent of mines, whose decision shall be final.

Fifth—The company agrees to a minimum rate of three dollars (\$3) per shift for miners in the lower seam workings of Number 1 and Northfield mines.

It being understood that the superintendent of mines shall be the judge as to the ability of the party to earn such minimum.

Sixth—The company agrees that when a miner is taken from the face to perform day work he shall receive the miner's day rate.

Seventh—The schedule for loading coal to be as follows:—

Upper seam, 30 cents per ton.

Lower seam, 35 cents per ton.

And for using buggies and loading roads:

At No. 1 Mine—

First 75 ft. from dump to face line, 5 cents per ton additional.

Second 75 ft. from dump to face line, 10 cents per ton additional.

At Northfield Mine—

First 50 ft. from dump to face line, 5 cents per ton additional.

Second 50 ft. from dump to face line, 10 cents per ton additional.

Third 50 ft. from dump to face line, 15 cents per ton additional.

Eight—The schedule for rock in coal of upper seam to be as follows:

When rock is 1 ft. thick, \$1 per yd.

When rock is 2 ft. thick, \$2.40 per yd.

When rock is 3 ft. thick, \$4 per yd.

Above schedule applies only to solid work with stalls 21 to 27 ft. wide. Skipping pillars take one-half these rates.

Ninth—The schedule for timbers to be as follows: Stringers—

50 cents each when 8 ft. long and under.

\$1 each when over 8 ft. long.

Sets—

\$1.50 each for 9 ft. collars.

\$2 each for 11 ft. 4 in. collars.

Tenth—The mining yardage, and day rates for

No. 1 mine shall be as shown on Schedule A, hereto attached, and which schedule is made part of this agreement.

Eleventh—The mining yardage and day rates for Northfield mine shall be as shown on Schedule B, hereto attached, and which schedule is made part of this agreement.

Twelfth—The company agrees to meet the committee of five, or a sub-committee thereof, on matters relating to this agreement or any new matter changing the status thereof.

Any vacancy on the committee of five to be filled at a duly called mass meeting of the underground employees of the company, or by a pit head ballot at the mine from which the vacancy exists.

The committee of five to have the handling of the check-weighman's and gas committee funds.

Thirteenth—The term and duration of this agreement shall be for a period of two years, beginning October 1, 1907, and terminating September 30, 1909.

Fourteenth—It is agreed to by the committee that all employees working for the company during the month of September, 1907, and who continue to work for the company after the execution of this agreement shall by such action be understood as agreeing to and endorsing the terms and conditions of this agreement.

All new men accepting employment after October 1, 1907, shall endorse this agreement by their signatures in a book containing a copy of this agreement and kept in the company's office.

Fifteenth—This agreement to be effective shall bear the signature of the manager and superintendent of mines for the company, and the committee of five for the men and the approval signature of the president of the company.

SCHEDULE A.

Mining, Yardage and Day Rates.

No. 1 Mine.

Mining—

Upper Seam—68 cents per ton.

Lower Seam—80 cents per ton.

Yardage—Upper Seam—

Levels, \$2.50 per yd. and coal.

Cross-cuts, \$2 per yd. and coal.

Levels when less than one-half of height is in white rock, \$7.50 per yd., coal to company.

Levels, when more than one-half of height is in white rock, \$8 per yd., coal to company.

Turning Stalls—

5 yd. long by 12 ft. wide—\$10 and coal.

Day Rates—

Fire Boss\$3.25

Shotlighters 3.00

Bratticemen 2.60

Timbermen 3.00

Timbermen's helpers 2.60

Tracklayers 2.75

Tracklayers' helpers	2.60
Roadmen	2.60
Drivers—Boss	3.00
“ —Double	2.75
“ —Single	2.60
“ —Boys	\$1.50 to 2.25
Pushers	2.60
Linemen	3.00
Motormen	2.75
Motormen's assistants	\$1.50 to 2.25
Engineers, diagonal slope	2.75
Engineers, endless rope	2.25
Winchers	\$1 to 2.60
Rope inspector	3.00
Endless ropes, boys	\$1.25 to 1.75
Endless ropes, men	\$2.60 and 2.75
Rope riders	\$1.50 to 2.60
Door boys	1.00
Cagers	3.00
Cagers' assistants	2.60
Miners	3.00
Loaders	2.60
Machine runners	\$3, \$3.25, 3.50
Machine helpers	2.60
Drillers	\$3, \$3.25, 3.50
Brushers	2.75
Muckers	2.60
Cogmen	2.60
Labourers	2.60
Pipemen	\$2.60 and 3.00
Pumpmen	2.60
Stablemen	2.60

SCHEDULE B.

Mining Yardage and Day Rates.

Northfield Mine.

Mining—

Upper Seam—68 cents per ton.

Lower Seam—80 cents per ton.

Yardage—Upper Seam—

Same schedule as for No. 1 mine.

Turning Stalls—

Same schedule as for No. 1 mine.

Day Rates—

Fire boss \$3.25 |

Shotlighters 3.00 |

Bratticemen 2.60 |

Timbermen 3.00 |

Timbermen's helpers 2.60 |

Tracklayers 2.75 |

Tracklayers' helpers 2.60 |

Roadmen 2.60 |

Drivers—Boss 3.00 |

“ —Double 2.75 |

“ —Single 2.60 |

“ —Boys \$1.50 to 2.25 |

Pushers 2.60 |

Rope inspector 3.00 |

Endless ropes \$2.25 to 2.75 |

Winchers \$1 to 1.50 |

Door boys	1.00
Cagers	2.75
Miners	3.00
Loaders	2.60
Machine runners	\$8, \$5.25, 3.50
Machine helpers	2.60
Drillers	\$3, \$3.25, 3.50
Brushers	2.75
Muckers	2.60
Cognon	2.60
Labourers	2.60
Pipemen	\$2.60 and 3.00
Pumpmen	2.60

Signed for the Company—

THOS. R. STOCKELL, Manager.
THOS. GRAHAM, Superintendent.

Signed for the Men—

DAVID ROGERS, JR., Chairman.
JAMES MILLER, Secretary.
THOMAS BOOKER,
JOHN CARR,
E. EDWARDS.

MINERAL EXHIBITS AT NELSON FAIR.

Ores From Nearly 60 Mines Were Exhibited.

NELSON'S MINERAL DISPLAY was the best made in British Columbia at any of the annual exhibitions of this year. Judging, though, by the comments made thereon by the *Nelson Daily News*, it was neither as large nor as good as might reasonably have been expected under the circumstances that Nelson is centrally situated among the mining sections of the Kootenay, is easily accessible from the chief mining camps, and is the distributing point for a considerable area of mining country. However, it is encouraging to find even one of the larger towns of the Kootenay and Boundary mining districts making an effort to induce mine owners to display ores for the information of those interested in the mining industry, and, too, it is gratifying to note that several of the larger mining companies responded to the appeal of the fair management by sending excellent exhibits, some of minerals only and others of ores and smelter products. In addition, it was well that advantage was taken of the unexpected opportunity that presented itself to obtain the services of two visiting experts to judge the mineral exhibits and to offer suggestions for future guidance, when other, and it is earnestly hoped larger and more varied displays of minerals shall be made in competition for the valuable prizes so generously offered.

The report of the *Daily News*, which gave deserved prominence to this section of what was, in other respects as well, a very creditable exhibition, was as under:

The following are the results of the competition for the mineral exhibits at the fair, which were

announced yesterday by Messrs. R. W. Wade and W. H. Wade of the Geological Survey of Canada:

Best display of gold mines ore: Poorman Granite mine, near Nelson.

Best display of silver mines ore: Mother Lode, near Sandon, Sloeun.

Best display of copper ores: No award.

Best display of zinc ores: Whitewater mine, Sloeun.

Best display of dry silver ores: Hewitt mine, near Silverton, Sloeun Lake.

Best display from any individual prospect, shown by bona fide owner: No award.

Best display of ores from Rossland district: Cup retained for next year.

Best display of ores from Boundary district: Cup retained for next year.

Best display of ores from Lardeau district: No award.

Best display of ores from Sloeun district: Silverton camp mines.

Best display of ores from Nelson and Ymir district: Cup retained for next year.

It will be noted that of eleven prizes offered only five were awarded by the judges. In some cases this was because there were no entries for the prizes and in others the displays were considered not worthy. Of the district displays of ores, which should be the chief feature of the exhibits, there was only one really good entry and that was from a group of mines around Silverton, which won the really fine silver cup donated. There were offered for competition three other cups of even greater intrinsic value, but there were no entries in place for them and the judges properly withheld them for competition next year.

There are more than 200 shipping mines in the district, and they were not at all adequately represented in the exhibit. Much of the ore exhibited was collected by Harry E. Wade personally around Nelson, and, indeed, if it had not been for his exertions the display of ore, which was good considering the very limited time at his disposal, would have been even less representative.

PROPERTIES REPRESENTED BY SPECIMENS.

The mines represented, either by the efforts of Mr. Wade or by the personal sending down of specimens to Nelson were as under:

Copper Ores: Queen Victoria, Red Rock, Eureka, Silver King, Le Roi, Le Roi No. 2, Centre Star, Mayflower, Harris Group, Mother Lode, Oro Denoro, Roundhill and Sunset. Of these the exhibits from the Centre Star and Sunset were very good, while those from the Mother Lode and Oro Denoro deserve special mention.

Gold Ores: Poorman-Granite, Nevada, Reliance, Fern, Lavina, Summit and Queen. Of these the Poorman-Granite was easily the best.

Silver-Lead Ores: Lightning Peak, Mammoth, Broadview, Vancouver, Emily Edith, Fisher Maiden, Alpha, Noonday, Canadian Group, Galena Farm,

Standard, Elkhorn, Blue Bell, St. Eugene, Krao, New Jerusalem, Spokane, Albion, Highland, Little Donald, United, Hunter V., Arlington, Lucky Boy, La Plata, Maestro, Second Relief, Alice Fraction and North Star. Of these there were good exhibits from the Blue Bell, St. Eugene and Elkhorn.

Dry Silver Ores: Hewitt and Reco; both good.

Zinc Ores: Lucky Jim, Slocan Syndicate, Last Chance and Whitewater. Of these the Whitewater was excellent.

In addition there was an exhibit of copper-lead ore from the Dandy, near Nelson, and a fine exhibit of various iron ores from the Five Metals Company of Crawford Bay. An exhibit of coal from the Galbraith Company's mine, Alberta, attracted much attention.

In all there were not 60 properties represented.

Under the first section of the display there were only three gold milling ores represented, those of the Poorman-Granite, Summit and Queen. For the silver lead ores the entries were the Elkhorn (Sandon), Summit, Standard, Last Chance, Slocan Syndicate and Canadian Group. For the copper ores the exhibits entered were from the Poorman-Granite, Mayflower and Consolidated Company's mines at Rossland, the last-mentioned being a fine exhibit. In zinc ores the entries were from the Bluebird, Whitewater and Last Chance, and in dry ores the only entry was that of the Hewitt. In the competition for prospects there were no entries. In the competition for the ores of the Rossland district the only entry was that of the Consolidated Mining and Smelting Company of Canada, which arrived late. In the Boundary competition the only entry was that of the Dominion Copper Company, which itself was offering the cup. For the Lardeau and Nelson districts, respectively, there were no entries; for the Slocan the only entry was that of the Silverton mines.

A comparison of the entries and the ores actually exhibited showed that there were only 29 mines entered while the ores from 60 were shown. The difference represents a small part of the work which Mr. Wade did in the short ten days at his disposal.

The finest exhibit on the tables was that of the Trail smelter which showed lead pipe of all sizes, antimony, bluestone (sulphate of copper), and the various products of the smelter generally in the way of low and high-grade matte, the products of the Heberlein roasters, slag of differing descriptions, etc. Another noteworthy exhibit was that of the Whitewater concentrating mill which showed the different lead and zinc ores going into the mill with 10 different concentrates—four of zinc and six of lead—as the product of its work. Other good exhibits were those of the Blue Bell on Kootenay Lake and the Arlington of Erie.

VALUABLE SUGGESTIONS FOR FUTURE EXHIBITIONS.

Speaking of the mineral exhibits, Mr. Brock had several excellent suggestions to offer. He is of opinion that the best of all prizes that can be offered

is that of the district prize. The cups offered are such that he thinks any district might well be proud to possess them. But there is another point of view, which is that of the time and money necessary before the prize can be won. It is not everybody who has the requisite time to make a representative display of the mines of his district or can afford the cost. He would, therefore, recommend the offering of a couple of additional money prizes of sufficient value at all events to pay the winner for his trouble and to make up in some degree to the second man.

As to the question of whether the ores are not to be retained by the fair management Mr. Brock was somewhat uncertain. If they are retained by the exhibition society then the possessor of high-grade ore whose exhibit might run up into hundreds of dollars in value would not show at all, for he would not want to have his ores confiscated. On the other hand if the ores were not so retained, then it would be easy to build up an exhibit from year to year which would eventually win the prize. This would be easiest of all for the home district and in a short time there would be no other districts competing. Perhaps a solution of the difficulty would lie in debarring from again competing the rock which had won at any time.

Then as to the point as to how much space should be given to such exhibits, Mr. Brock thinks the management should notify exhibitors beforehand of the amount of space available for such displays, giving each district a like amount of space. As to the collection, the points to be counted should be the display of the sample itself, its characteristics whether or not those of the mine, whether the surface has been fresh faced and cleaned, whether clean or the reverse, whether properly mounted or not, and whether the district is or is not properly represented. For instance if one district has 40 shipping mines and another but 20 it is evident that if the first exhibit 30 ores out of the 40 it would not be nearly as representative as the second if it displayed 18 ores out of the 20. It also follows that ores competing in such displays should be completely labelled with the name of the mine and the character of the ore.

Of course all this refers not to the competition with one district of the different mines of that district but a competition for a grand challenge cup, in which all districts enter, not as mine against mine, but as district against district.

For the mounting of ores Mr. Brock recommends a thin stand of wood with bevelled edges painted a dull black for the larger ores, whereas the smaller pieces could well be shown in cardboard trays with cotton batting behind.

With regard to the district display in which the several mines of each district enter into competition the one against the other, the name of the mine competing should be withheld, but not the characteristic of the ore nor the assay values. In fact the fuller the information afforded the better educational value the display will have to the general public.

In the competition for the various sorts of ores the recommendation given is to have as full a description of the ore given as may well be obtained, withholding only the name of the mine until the award has been given. It would be instructive if the mine were to give samples of the vein from hanging-wall to foot-wall with a specimen at either end of the foot- and hanging-walls and of the gangue generally.

Specimens are not necessarily judged on their size. A specimen weighing half a ton, all other things being equal, would take a prize over another weighing only a few pounds. But if the smaller specimen were the more perfect and showed the characteristics of the ore better, then it and not the larger size would win. Still size takes the public eye.

Another recommendation is that a prize be offered for the best specimen of an ore not enumerated upon the prize list. This, Mr. Brock thinks, would bring the attention of the public more quickly to new finds and would also stimulate the prospector in seeking after such things. Too often the presence of a mineral which is not expected will be passed over because the prospector is hunting gold or copper, silver or lead as the case may be.

Similarly there should be a prize for prospects; properties which are not Crown-granted, have never shipped ore, or which have been recorded under a year or so. This would often attract the attention of visitors at the fair, men who are on the look-out for just such properties.

If the mineral display at this or at any other fair is to be of benefit to the country it must have an educational value and should represent the district so thoroughly that the visitor can learn all about its minerals by thoroughly examining the exhibits. It would then have a value directly to the exhibitor and indirectly to the district exhibited, through the attraction of capital necessarily resulting. The trouble ahead is in the offering of sufficient inducements to the exhibitors and in the financing of the inducements.

ANOTHER ACCOUNT OF THE DISPLAY.

From the account of the Nelson *Canadian* the following extracts have been taken:

The honours of the competition went to Silverton and no one can say that they were not fully earned. The exhibit was prepared by W. H. Brandon and N. F. McNaught of Silverton, and G. Aylard of New Denver. It included specimens of ores from eight mines, viz., the Fisher Maiden, Hewitt, Standard, Canadian Group, Mountain Boomer, Emily Edith, Alpha and Vancouver. The award of the Trail smelter's cup for the best district collection was a foregone conclusion.

A special award was made to the exhibit from the Hewitt mine, which was a splendid collection of specimens of dry silver ore.

The first prize for free milling gold ore was awarded to a collection from the Poorman-Granite mine, operated by J. P. Swedberg.

Three cups were not awarded and will be available for competition next year. The cup offered by the Dominion Copper Company for the best exhibit of Boundary ores was won by an exhibit from its own properties so this trophy was at once returned to the association for a similar competition next year.

There were not enough entries for the competitions for the Rossland and Nelson and Ymir districts, and the cups offered in these classes are held for next year.

There were many splendid exhibits of ore not specially entered for any cup competition, but prizes were awarded to some of them. Among the mines making such entries were the Whitewater and the Elkhorn, the latter operated by W. McClurg, of Sandon.

There were also excellent displays from the Broadview, in the Lardeau; from the Harris Group, on White Grouse Creek; from the Five Metals Company, operating near Crawford Bay. The last-mentioned display included galena, porphyritic silver-lead, and gold-copper.

The North Star at Kimberley, the La Plata and the Blue Bell were all represented by splendid specimens of silver-lead ore.

The Canadian Consolidated Company contributed a splendid display of lead and lead products from its smelter at Trail.

MINING IN THE SLOCAN.

Activity in Mines at and About Sandon.

OF MINING NEAR SANDON the *Slocan Mining Review* recently gave the following particulars, which appeared in that journal on October 10:

Work at the mines is progressing with smoothness. All the well-known properties are maintaining their shipping average and several prospects are entering the shipping list.

From the Majestic an initial car of \$100 ore was brought down this week and the packers have from other prospects as many orders as they can fill.

Excellent reports continue to come from the Reco, and several car loads of rich antimonial silver ore have been sent to the smelter.

The Eureka tramway is being constructed with all speed, and will be in working order in about six weeks. Meanwhile the work of development goes on at the mine with a big crew.

At the Ruth and Hope they are working on ore, and the mill keeps up its steady grind. Two shifts are working at the Slocan Star. At the Elkhorn they have begun a new cross-cut, but a shift is still drifting. Another car of good ore is being got ready.

At the Lone Bachelor Geo. Petty, the owner, is working a full crew with good results. The local syndicate now operating the Goodenough is cross-cutting and confident of tapping the rich Reco-Goodenough vein.

Litigation still debars the Last Chance management from carrying out its programme, but the long cross-cut on undisputed ground is being pushed ahead under contract.

The Canadian group has been a steady shipper all the summer and ore is still coming down. An adjacent property, the Adams group, which is being worked under lease, made a car load shipment a week ago. At the Queen Bess, the parties who recently took a lease on the lower workings are reported to have struck ore.

E. H. Macdonald, consulting engineer for the Anaconda, Butte, made an unofficial visit of inspection of the Ya-Ya this week, and to our representative spoke in glowing terms of Dr. Gomm's prospects. He characterized the ground as a shear zone, and openly expressed his confidence in the ultimate success of the doctor. The same expert whilst here spent several days inspecting the Chicago group, which is now being worked by Milwaukee capital.

They are getting out some very nice ore at the Sovereign, and the same is being done at the McAllister. The Alps and Alturas group is also being successfully worked for antimony, and a large amount of this valuable ore is sacked.

There is every prospect of the Payne resuming some of its old-time activity in the near future. The new company are now arranging their programme of developing this old shipper, and with this end in view Secretary Low and two experts are now inspecting the property.

The mines contiguous to the Silverton camp are all being worked full blast. The resumption of operations at the Hewitt on a large scale has given a fillip to the industry at that end of the district. The Standard, Vancouver, Emily Edith, Buffalo and other mines are all keeping up their reputations and shipping regularly.

Work of leasers around the Sandon camp this year has been productive of good results. In many instances individuals have succeeded where companies with large capital have failed.

LANDSLIDE FEARED BY MINERS AT CROW'S NEST PASS, B.C., COLLIERY.

MINERS employed at the Crow's Nest Pass Coal Company's Coal Creek mines, distant about four miles from Fernie, Southeast Kootenay, fearing that part of the mountain above the entries to the coal mines and the neighbouring town in which they and their families live, telegraphed to the Provincial Department of Mines requesting that official examination into the condition of the mountain be at once made. The local government inspector of mines was immediately instructed to report by telegraph and the provincial mineralogist was sent up from Victoria to make an examination and enquiry, so as to fully satisfy the Government that the fears of the miners were groundless. There has not yet been time for the provincial mineralogist,

Mr. W. F. Robertson, to ascertain the conditions and report to the Government thereon, but in the meantime the fissure in the mountain has been carefully examined, under instructions from Mr. G. G. S. Lindsey, general manager of the Crow's Nest Pass Coal Company, by Mr. James D. Hurd, M.E., C.E., of Illinois, and the following officials of the company: Mr. R. G. Drinnan, general superintendent; Mr. James McEvoy, chief engineer and geologist, and Mr. Andrew Colville, mine superintendent. All concurred in making the following report:

"Acting on instructions we today examined the fissure in the mountain north of Coal Creek. It is simply a widening out of one of the old natural jointage places in the rocks. From its position should any fragments ever be loosened they would fall into the valleys or draws behind or to the west of the colliery and not in the direction of Coal Creek town or plant, but in any case would not come a quarter of the way down the mountain side on account of the slope at this point. But we do not anticipate that even small fragments will so break away.

"The rocks are almost horizontal in the mountain, and even if the crack should at some remote time extend to the bottom, which is not likely, the cut-off portion of the mountain would be just as stable as the rest, as the slope of the mountain is less than the angle of rest.

"In the Rocky Mountains, owing to the wear of nature, small fragments of rock break off occasionally, but never reach the bottom where the slope is as it is in this case.

"In our opinion there is absolutely no danger whatever to life or property at either the mines or the town of Coal Creek from the existing conditions or from any result of these conditions which in our opinion could happen."

In order to allay apprehension among the miners and others employed about or living in the vicinity of the mines, many of whom remember the fearful destruction of property and loss of life caused by the big rock slide that occurred in April, 1903, at Frank, Alberta, distant about 50 miles from the Coal Creek colliery, this report has been printed and distributed among all immediately concerned and, as well, published in the local newspapers.

The Canadian commercial agent at Sydney, New South Wales, in a recently published report stated that: "The production of minerals in New South Wales has steadily increased for ten years, the value of minerals produced having been in 1896, £4,431,643, and in 1906, £7,912,716. There was an increase in all the minerals produced—gold, silver, copper, tin and coal. The increase in gold was only about £5,500, but in silver it was more than £1,000,000, while copper increased four-fold, tin nearly four-fold, and coal nearly double. The increases in copper, tin and coal were largely due to the higher prices of those minerals.

THE EMMA MINE, BOUNDARY DISTRICT.

By Frederic Keffer, Greenwood, B. C.

THE EMMA MINE was the subject of a paper prepared for the "Journal of the Canadian Mining Institute," and submitted at the annual meeting of the institute, held at Toronto, Ontario, last March. The writer, Frederic Keffer, engineer in charge of the mines of the British Columbia Copper Company, has been actively engaged in mining in the Boundary district for 11 years, so is well informed concerning mining in that part of the Province. Of the Emma he wrote:

Among the low-grade mines of the Boundary district the Emma is in a way unique, in that the magnetite, which constitutes the main portion of the ore body, has persisted from the grass roots to at least the 250-ft. level in a practically continuous vein or deposit; also, in that the vein stands vertically so far as explored.

In the other low-grade mines of the district magnetite is a frequent constituent of the ores, but its occurrence is most erratic, the deposits being irregular, varying in size from a few ounces to masses of thousands of tons, and frequently dipping (so far as any dip is observable) entirely at variance with the general dip of the ores with which they are associated.

A characteristic case was that of a body of magnetite of exceptionally good value found on the 300-ft. level of the Mother Lode mine, which lay perfectly flat, being about 20 by 100 ft. in area, but only 7 to 8 ft. thick, and which was encased in barren eruptive rocks.

In the Emma (save in Quarry No. 1, where a slip has thrown the ore about 25 ft. to the southeast) the magnetite continues unbroken to a point some 200 ft. below the surface, where diamond drilling has found what is seemingly another slip, throwing the ore again a short distance to the southeast. Diamond drilling on the 250-ft. level has recently located the ore near the shaft.

The Emma ores are found along the contact of eruptive rocks and limestone, which limestone is here like an extensive "island" surrounded by eruptive flows. These latter rocks are of the general types characteristic of the Boundary district, analyses of which usually lie between the limits of:—

Silica	30 to 40 per cent.
Iron	15 " 25 "
Lime	10 " 20 "
Magnesia	0 " 5 "
Alumina	5 " 15 "
Alkalies	0.5 " 2 "

To the east of this "island" of limestone are several pyrrhotite deposits, the most prominent of which is that occurring on the Mountain Rose mineral claim. This pyrrhotite is extensively mined for use

as a flux, it being sometimes essential in order to reduce the grain of copper matte, thereby aiding the subsequent casting, which accompanying matte contains about 2 per cent. copper. The sulphur ore consists of pyrrhotite, together with varying proportions of lime, alumina and silica, but with little or often no magnetite. In striking contrast with the Emma are the extensive beds of pyrrhotite.

On the Emma, to the south of the limestone "island," occurs a body of magnetite, which when mined contains 30 to 40 per cent. copper. This ore was followed to a depth of about 25 ft., where it was cut off by a slip, beyond which no further work has been done. But little pyrrhotite was found in this place.

To the west of the limestone "island" occurs the main ore body of the Emma mine, which ore has been developed by quarries and drifts for some 575 ft.

Most of the ore next to the east wall of the deposit (which here runs about 5 deg. east of north) is magnetite, but minor bands of garnetite also occur. Along the northwest wall, however, the magnetite for the most part is next to a garnet zone, which (where cross-cut by diamond drilling on the 150-ft. level) passes into a bluish and very silicious rock, beyond which the drill was not pushed.

In other places the magnetite stands directly against snowy white crystalline limestone, which latter rock, when near the ore, frequently carries masses of magnetite and chalcopyrite embedded within it, this mineralization extending sometimes several feet into the limestone in diminishing ratio. In other cases, however, the line between this limestone and the ore is clear cut. The garnet zone is about 20 to 25 ft. thick and in places carries sufficient copper to pay for mining.

More or less epidote also occurs along both walls of the ore. The magnetite frequently includes masses of crystalline lime spar, which are almost always accompanied by enrichments of copper. The garnet zone includes considerable magnetite scattered through the rock in crystals and little patches.

On the surface to the north of the workings the magnetite gives place to garnet ore well mineralized with copper pyrites. Still further north (about 1,000 ft.) the garnet again crops for several hundred feet carrying good values in copper, but now dipping to the west about 70 deg. The copper and gold contents of the ore show decided increase on the 150-ft. level as compared with the ore mined in the quarries. 100 lb. ore on the 150-ft. level contains 1.1 lb. copper and 0.007 oz. gold.

Quarry—Gold, 0.007 oz.; silver, 0.06 oz.; copper, 0.52 per cent.; lime, 14.6 per cent.; silica, 34.0 per cent.; lime, 12.1 per cent.; sulphur, 1.1 per cent.

150-ft. Level—Gold, 0.031 oz.; silver, 0.06 oz.; copper, 1.28 per cent.; silica, 14.9 per cent.; iron, 40.7 per cent.; lime, 14.4 per cent.; sulphur, 1.7 per cent.

So that this ore, which was at first mined solely as an iron flux, has, under the conditions obtaining

in the Boundary, become intrinsically valuable as well.

The average thickness of the magnetite deposit in the upper workings is some 18 ft., but on the 150-ft. level the ore widens materially, being in places 40 ft. across, exclusive of the garnet ore zone. A fair average thickness of the workable ores of the mine would be 25 ft. Below are given analyses of the garnet zone, the silicious bluish drill cores beyond the garnet, the general country and also the white crystalline limestones, the rock lying immediately east of the magnetite and an approximate average of the general eruptive rock of the district. Alkalies, magnesia and other constituents present in small quantities are not included:—

	Silica.	Iron.	Lime.	Alumina.	Sulphur.
Garnet zone	26.8	23.5	32.6	12.0	1.5
Bluish drill core beyond garnet	63.6	5.3	4.5	16.9	0.52
Limestone country rocks	18.3	2.3	43.9	5.6	0.00
White crystal. limestone	7.6	0.8	56.0	0.3	0.12
Rock next the magnetite on the east	38.5	6.5	27.6	19.3	0.47
Eruptives	35.0	20.0	18.0	15.0	

It is evident from these analyses that the limestone and eruptives contain in sufficient measure all the constituents necessary for the formation of the garnet and magnetite zones. That these latter rocks were produced by the hot water gases and water carrying dissolved mineral derived from the eruptives, leaching upon the adjacent limestones through replacement and recombination, can hardly be doubted.

It is seen from the analyses of the ore that the sulphur present is very small, barely more than sufficient to form the copper pyrites present.

Iron sulphides are of rare occurrence, and it seems certain that the magnetite was deposited as such, and did not result from the alteration of sulphides. This view is borne out by the fact that as a rule magnetite crystals and not iron sulphides are found in the garnet zone, however far removed from the main body of magnetite. The crystalline limestone found next the magnetite in the mine is considerably purer than the main portion of the limestone formation.

(Note—Here follow comments on rock sections, four reproductions of photographs of which illustrate the paper. As it is not practicable to here show these illustrations, the comments on them are omitted.

Editor MINING RECORD.)

MINING.

Owing to the vertical position of the deposit, mining here is a much simpler problem than in most of the Boundary mines. The shaft is a two-com-

partment incline, angle 60 deg. Across the drifts are placed heavy stulls supported by posts, the stulls and posts in the widest portions of the drift being often of a diameter of 30 in.

The stulls are placed 5 ft. apart, and are covered with 8 to 12-in. pole lagging. Chutes are provided at convenient intervals, they being at the opening $3\frac{1}{2}$ to 4 ft. wide by 2 to $2\frac{1}{2}$ ft. deep, so as to allow large rocks to pass. The ore is broken down on the timbers to the level above, only the swell being drawn from the chutes, which swell amounts to about 40 per cent. After the level above is reached the stopes can be drawn at will, and, commencing at the point furthest from the shaft, the timbers can be removed if in condition to be used elsewhere. In commencing a stope it of course is necessary to first raise to the level above to secure ventilation. In portions of the work where bodies of crystalline limestone or poor garnet ore are found these are left as pillars to reduce the cost of timbering. The ore is so heavy, averaging from 8 to $8\frac{1}{2}$ cu. ft. to the ton when in place, that timbering must be of the heaviest description to bear the weight above, which weight, owing to the vertical walls, rests almost entirely on the timbers. Power is supplied from the Bonnington Falls electric plant some 85 miles distant, the machinery at the mine consisting of a 12-drill cross compound Rand air compressor driven by a 200-h.p. motor, together with a hoist now driven by compressed air, but which will shortly be replaced by an electric hoist. There is also a steam-driven X Ingersoll straight line Class A air compressor, capacity about 8 drills, which machine is held as a reserve.

There have been shipped from this mine to date some 93,500 tons of ore.

A report sent out from Ottawa a few weeks ago was to the effect that a recent government return shows the value of the smelting industry of Canada to now be \$28,426,328, and that it has quadrupled in five years. In 1901 it was but \$7,082,384. In comparison with the other industries smelting is fifth on the list.

Under date, June 22, the Canadian commercial agent in Newfoundland reported: "Serious complaints are being made on all sides in regard to the exorbitant prices charged here for coal, both anthracite and bituminous, while the quality of the latter is very far from being as good as it should be. In view of the fact of the comparatively short distance of this colony from the source of supply in Cape Breton, and the excellent water facilities that exist for cheap freight, it does appear that there is a just complaint and a reason for investigation into the cause of it. The duty charged on coal entering the port of St. John's which is applied to municipal purposes, at present fixed at \$1 per ton on anthracite and 70 cents on soft coal, is not sufficient to account for the difference in price that exists between the cost here and in Canada generally."

DREDGING FOR GOLD IN AUSTRALIA.

An Official Report on Australasian Gold Dredging.

DREDGING FOR GOLD is being carried out to an increasing extent as its effectiveness in recovering much of the alluvial or placer gold becomes more generally recognized. New Zealand has long led in this industry, but on the mainland of Australia operations are now important enough to have led the Canadian commercial agent for several of the Australian states to take note of the results achieved in part of the territory under his official observation. He reports as follows:

DREDGING, MINING, AND HYDRAULIC SLUICING IN VICTORIA.

Gold mining by means of dredging, hydraulic sluicing and centrifugal pumps has developed, during the last three years, into a most important industry in the State of Victoria. It has resuscitated some old alluvial mining districts—considered to be worked out—from a dormant state to a condition of activity and speculative excitement. The success of mining by means of dredging and hydraulic sluicing rests almost entirely upon the expeditious mode of treatment of large areas, as in most instances the ground operated upon is of a character that had been proved too poor to be made payable by the ordinary methods. Miners accustomed to exploit gold-bearing gravels upon river banks had—before the advent of gold dredging—been compelled to abandon some rich runs of ground on account of their having dipped underneath the stream.

GOLD DREDGING AND HYDRAULIC PLANTS IN VICTORIA.

It is estimated that there are now in operation in various districts in the State of Victoria some 90 bucket dredges and hydraulic-pump sluices. The cost of a modern dredge, fitted with improved appliances, in a great measure depends upon the nature of the ground to be dealt with, but assuming that the depth does not exceed 35 ft., the machinery, lumber used in construction and cost of building should not—under ordinary transportation facilities—cost more than £5,000—say \$24,333. The engines used are generally 16 h.p. of a similar type to the English makes of Marshall's or Ruston and Proctor. Boilers are chiefly 20 h.p. while the winches require a 4 or 5 h.p. engine. For ground 30 to 35 ft. deep it has been found necessary to have a 20 h.p. engine and a 25 or 30 h.p. boiler. The equipment of some recently built dredges has been made in this state.

OBJECTIONS RAISED AGAINST GOLD DREDGING.

Objections, raised in Victoria, of stream pollution and destruction of agricultural land against bucket dredging are in the main ill-founded. The dredge puts no foreign matter into the stream, and there can, therefore, be no pollution, whilst discolouration of the water is—in this country at least—frequently due to natural causes. Bucket dredging consists of

lifting the material from the bed of the stream and depositing it, after the gold has been extracted, at the bottom of the stream. The mass of material and mud which depends at various seasons to be found has vastly increased in the various dredging districts.

THE GOLD DREDGE OF THE DISTRICT OF BRIGHT.

The principal gold dredging in Victoria is in the vicinity of Bright—distant nearly 200 miles from Melbourne by railway. The river at one time covered the whole of the flat land between the hills, consequently there is river gravel everywhere and gold is more or less distributed throughout the whole valley. There are no marked differences of conditions, as clay is almost entirely absent from the gravel, and most of the bottom is false and soft. The wash, except in the higher reaches of the river, is light and very easily treated. The depth rarely exceeds 25 ft., the average being 16 ft. The valley is considered to be ideal dredging ground, and any property showing a prospect of 2 grains of gold to the cu. yd., by fair prospecting, is good enough for at least 20 per cent. return on the capital invested. The average turnover for each dredge is from 5,000 to 6,000 yd. per week.

A modern dredge recently treated three acres of ground to an average depth of 12 ft. in five weeks, which means some 58,080 yd. total, or an average of 11,616 yd. per week. The cost of treatment amounted to 13½d. (3½ cents) per yd., and the wash averaged in value 4½d. (9 cents). From this result it can easily be seen that a 2-grain proposition can be made highly remunerative under favourable conditions. Chiefly through lack of experience, several pioneer dredging companies failed, but that the industry is now placed upon a firm foundation is unquestioned. In the district of Bright, 22 dredges are operating payable ground and returning handsome dividends. From these 22 dredges, gold valued at £123,000 was obtained in 1906, and, as the average amount of wages, expenses and depreciation of each dredge did not exceed £60 per week, no less a sum than £68,000 would be absolute profit from a capital outlay of about £110,000.

It is estimated that ultimately over £2,000,000 worth of gold will be recovered at Bright which could not have been won by any other process than by dredging. This ground had been abandoned by old gold diggers as unpayable, and at one time over 20,000 Chinamen were upon this field, so that practically very little ground was left untried. While the exact figures are not yet available, the Victorian Mines Department states that in 1906, approximately £4,000,000 of gold were obtained by dredging and sluicing in this state, the value being about £340,000.

THE GOLD DREDGE OF THE DISTRICT OF BRIGHT.

Victorian experience has proved that there is little or no risk in bucket dredging for gold, if the prospect is to be made payable. The gold is recovered in a fine state, and the tailings are of a fine quality.

able. The work of dredging is simplicity itself, besides which the cost of the plant is comparatively small, but in this state—as well as in New Zealand—some purely speculative dredging enterprises were promoted upon chance, with the result that many thousands of pounds were lost which could have been saved by judicious prospecting at small expense. The nature of the wash, the depth and character of the bottom, the water supply and absence of clay are all important elements in successful gold dredging.

OFFICIAL VISIT TO COAL MINES OF SOUTHWEST ALBERTA.

Minister of Interior in Blairmore-Frank District.

HON. FRANK OLIVER, minister of interior in the Dominion Government, paid a short visit to the coal mines in the Blairmore-Frank district of southwest Alberta on September 24. The purpose of this was understood to have been to allow of the minister obtaining first hand some information relative to local conditions in connection with the coal mining industry of the district. The *Frank Paper* thus tells of the hon. gentleman's doings during the day he spent in that coal-mining locality:

Mr. Oliver arrived Tuesday morning and put in the entire day driving over the district to see the different coal camps and in going thoroughly into the coal situation in all its aspects. In the morning he visited Bellevue, the Maple Leaf and the new town-site of Hamilton. In the afternoon, in company with O. E. S. Whiteside, general manager of the West Canadian Collieries, Ltd., General Manager S. M. Moore of the Canadian-American Coal and Coke Company, and Vice-President H. N. Galer of the International and Alberta companies, made a trip to Lille by special train. In the evening he was driven to Blairmore and Coleman. He left Frank on the evening train for Pincher Creek. It was therefore an exceedingly busy day the minister spent in the district and he did not get to see as many people as he had hoped to, but as the main object of his visit was to familiarize himself thoroughly with the conditions connected with coal mining in the district, as relates to the facilities of the different companies for supplying coal, the output that can be depended upon with adequate transportation facilities and the transportation situation itself, he felt that all other matters must be subordinated to the accomplishment of that purpose, since he had but the one day to devote to the district.

Mr. Oliver held conferences with the general managers of the principal producing companies relative to the points in question and made a sufficient inspection of the plants to enable him to speak with authority when the cases of fuel and transportation in the West shall come before the House at the coming session of Parliament, as is anticipated will be the case.

He was profoundly impressed with the many manifestations of growth and advancement in the district. "You certainly have a wonderful country," said Mr. Oliver to the *Frank Paper* after having gone over the district. "You only require adequate railway facilities to make your community one of the most important in our country."

SHORTAGE OF RAILWAY CARS FOR FUEL.

FUEL CARS are not likely to be short during the ensuing winter, according to A. F. Dillinger, assistant to the chief traffic expert of the Railway Commission. An Ottawa press despatch states that Mr. Dillinger has made a report to that body regarding the alleged shortage of cars for fuel on the Crow's Nest branch of the Canadian Pacific Railway.

He visited Lethbridge, Frank, Lille, Hillcrest, Bellevue, Blairmore, Coleman and Fernie, and found that there was a shortage of cars to some extent during the months of April, May, June and July. Owing to wintry weather continuing well into the spring the equipment was tied up to some extent in April and May. The strike in the coal mines, accidents on the line and the fact that the railway company was directing its energies toward moving the previous season's grain before the new crop came in, accounted for the shortage in June and July, but at the time Mr. Dillinger was there (about August 20) more cars were on hand than were required.

Since July, Mr. Dillinger says, cars for Canadian coal on the Crow's Nest line have given facilities for maintaining the supply. The mines shipping domestic coal have not been short of cars since July, but mines shipping to the United States have been short at times. Owing to a scarcity of men few of the mines are working to full capacity, but with 2,000 cars in continuous service throughout the Crow's Nest district, he thinks there is not likely to be any shortage of cars for handling all the coal the mines can supply.

Mr. Dillinger further states that there was then in store at prairie towns west of Winnipeg 25,000 tons of coal for domestic use, exclusive of what had been delivered to consumers, and a further supply was and is still coming in for use on the railways. The C.P.R. has in store west of Winnipeg 100,000 tons of steam coal for winter use, with not less than 150,000 tons at Fort William and 150,000 tons more booked to arrive before the close of navigation.

The Canadian Northern also has in store, west of Winnipeg, about 20,000 tons of steam coal for winter use, and 160,000 tons at Port Arthur.

The official record of the number of persons employed at mines in British Columbia in 1906 gives the following figures: At metalliferous mines—shipping 3,718, non-shipping 265, total 3,983; at coal mines, 4,805; grand total, 8,788.

COMPANY MEETINGS AND REPORTS.

CANADIAN-AMERICAN COAL AND COKE COMPANY

The annual meeting of the Canadian-American Coal and Coke Company was held in Toronto, Ontario, on September 14, when the financial statement and the general report of the company were presented to the shareholders.

The *Frank Paper* says: The items of chief interest in connection with the meeting arise from the reports referred to. The financial statement shows that during the fiscal year just ended, the company mined and sold 143,605 tons of coal and that the mine was worked 234 days, giving an average of about 614 tons of coal per day. Considering the drawbacks the company laboured under during the year—of being closed down by the strike in the spring and by the cave in the main entry later—and the fact that at no time since the strike was inaugurated last March has the company had anything like a full complement of men, this showing is regarded as highly satisfactory. The statement shows that the company made a good profit on the coal, which profit was put back into the mine in development and new equipment.

The report of General Manager S. M. Moore contains some interesting information. It recites the fact that the mine, which was the reverse when he came to it, is now in first class condition, with the ventilation thorough and the travelling and escape ways for the men in good order and safe.

The report further states that a commencement has been made sinking a slope, that all the rock work and timbering in connection with this are completed, together with the passage of the main haulage around the station, while the slope itself is down 30 ft. All the timber for sinking 800 ft. is on the ground and paid for.

With reference to the opening of the new seam, the report states that the rock tunnel together with the return railway are completed, that the track has been put down, and drifting on the coal in two directions started; that 50 tons of coal are being taken out of the seam daily, and that the output from the seam will be steadily increased as room for raising chutes and breasts is made. It says, further, that with a full complement of men, the mine is now in shape to produce 800 tons of coal a day and that within eight months, the output will equal the full capacity of the handling plant, which is about 1,500 tons.

Officers were appointed for the year as follows: President, H. L. Frank; vice-president, J. F. Silverman; secretary-treasurer, G. S. Rochfort. The directors are: H. L. Frank, J. F. Silverman, H. L. Silverman, S. M. Moore and A. E. Spriggs.

GRANBY CONSOLIDATED MINING, SMELTING AND POWER COMPANY.

The annual meeting of the Granby Consolidated Mining, Smelting and Power Company, Limited, was held in New York on October 1.

The general balance sheet, as at June 30, 1907, is as follows:

ASSETS.

Cost of land, real estate, machinery, buildings, dwellings, and equipment	\$15,180,914
Stocks, bonds and bills receivable	895,675
Fuel and store supplies	110,037
Cash and copper	853,280
Total	\$16,940,906

Capital stock issued	\$1,500,000
Dividend collected on liquidated shares	884
Accounts and bills payable	783,765
Surplus	2,775,757
Total	\$17,060,406

INCOME ACCOUNT.

Working expenses	\$ 1,132,333
Foreign ores purchased	154,150
Total expenses	\$ 2,509,612
Net profit for the year	\$ 1,132,333

Adding the balance brought over from the previous year, gave a total surplus of \$4,472,676. Payments from this were \$76,918 for exploration and bonus to employees; \$1,620,000 for dividends; total, \$1,696,918, leaving a balance of \$2,775,758, as above. There was expended for new construction and equipment, \$317,678, and for additional mining properties, \$68,164. The cost of working was \$3,697 per ton of ore; the net cost per pound of copper, after deducting value of gold and silver, was 10.14c. The average prices realized, with the quantities turned out were: Copper, 16,410,576 lb., 22.21c. per lb.; silver, 257,358 oz., 67.9c. per oz.; gold, 35,083 oz., \$20 per oz.

Mine development was 9,701 lineal ft.; diamond drill development, 7,279 ft. The smelter report shows 665,915 dry tons smelted, 649,022 tons being Granby ore and 16,893 tons foreign ore.

President Langeloth's report says: "The operations during the year show a considerable falling off as compared with the previous year, in spite of the fact that the mines were prepared to furnish a very much larger tonnage and the smelter fully equipped to handle the same. This is due to the great shortage of fuel throughout the West in the past year; the railroads were unable to procure sufficient coal to operate their trains and the company sufficient quantities of coke for its furnaces.

"In the British Columbia coalfields, whence our supply of fuel is drawn, there were two strikes, one last fall and the other last spring, resulting in the production of coke being seriously interfered with and the output crippled to such an extent that at no time could the quantities contracted for be delivered. A very severe winter caused blockades of all the railroads, which, irrespective of this, were hardly able to take care of the largely increased traffic. In order to relieve the situation temporarily, contracts were made last October for about 20,000 tons of eastern coke, which entailed an extra expenditure of nearly \$100,000, but later in the season even these supplies were stopped on account of the railroads being unable to make deliveries. All these circumstances interfered seriously with the operations of the plant, and the cost of mining and especially of smelting increased considerably. The eight large furnaces could be operated only intermittently, and during the month of May both mines and smelter had to be closed down for want of fuel. The output suffered heavily, especially at a time when prices for copper were at the highest, and this in turn precluded our receiving as high an average price for the product as would otherwise have been the case. All copper is sold at the current prices ruling as soon as the weight and assays are agreed upon with the refiners, and no stocks are, therefore, on hand.

"It was estimated at the beginning of the year that, due to the greater capacity of the smelter, the production could be increased to about 25,000,000 lb. Instead of this, only 16,410,740 lb. of copper were produced, or about 3,250,000 lb. less than the previous year. In spite of all these adverse conditions, the net profits are somewhat higher, but not at all in harmony with what ought to or could have been accomplished if the regular supply of coke could have been secured. The cost per pound of copper produced, after deducting the value of gold and silver, was 10.14c. during the past year, against only 8.35c. in the preceding year. If the mines and

plants are operated to their full capacity, lower costs can again be confidently expected. At the smelter the eight furnaces are now in shape to handle over 1,000,000 tons of ore per year, which should produce in the neighbourhood of 30,000,000 lb. of copper.

"Among the more important new work undertaken and completed at the mines was the sinking of the new Victoria three-compartment shaft, which will be connected with the different ore levels; a complete electric hauling system is being installed on the 400-ft. level. It is estimated to hoist and crush 2,000 tons of ore daily at this shaft alone. The shipping bins are between the tracks of the Canadian Pacific and the Great Northern railroads, giving the advantage of transportation to the smelter by two roads.

"The Gold Drop and Monarch properties, acquired about two years ago, have been developed vigorously, and have proved valuable additions to our holdings. Very large quantities of ore are in sight and shipping facilities have been provided to handle a large tonnage. In a word, the mines are prepared to produce practically any tonnage that can be transported to the smelter, where the entire eight furnaces have been enlarged, and have now a maximum capacity of about 3,500 tons per 24 hours.

"One element of uncertainty in the past—which at times crippled the work—has been eliminated. A contract on favourable terms has been made with the South Kootenay Power Company for the supply of electricity. The plant has been completed, and power in abundance is now being furnished.

"The question of securing regular supplies of coke has been constantly before the board, and after mature deliberation it was decided to acquire a considerable interest in the Crow's Nest Pass Coal Company, Limited, from which our main supply of fuel is secured. The wisdom of this step has already made itself felt, as for the last few weeks a full supply of coke has been furnished, thus overcoming the difficulties which, as already mentioned, were very costly to the company. Vice-president and general manager Jay P. Graves has been elected a director of the Crow's Nest Pass Coal Company.

"The above mentioned expenditures may make it advisable in the near future to issue the treasury stock of 15,000 shares of the par value of \$100 each, in which event the same will be offered to the stockholders *pro rata* to their holdings, on terms still to be decided upon by the board.

"Considering the large quantities of ore which have been developed during the year, the board feels justified in continuing its work of providing a larger smelting capacity, but improvements of this kind take a great deal of time and have to be laid out in a careful way, in order to secure the most economical treatment and best results.

"During the year the shares of the company were converted into \$100 shares par value, by exchanging 10 shares of \$10 each into one share of \$100. The new shares have been listed on the New York and Boston stock exchanges, and the conversion was a success, as on September 13, when the books closed, it showed that 134,099 shares of \$100 each are outstanding and 9,910 shares of \$10 each.

"Four regular quarterly dividends, in all 12 per cent., have been declared during the past year."

SULLIVAN GROUP MINING COMPANY.

The annual meeting of stockholders in the Sullivan Group Mining Company, owning and operating the Sullivan mine and smelter at Marysville, East Kootenay, was held at Spokane, Washington, on September 26. Out of a total of 3,000,000 shares, 2,193,855 were represented at the meeting.

The report of the treasurer showed about \$6,000 in the treasury. The company mined some 8,000 tons of ore during the first part of the year and more than twice that quantity in the latter half.

The operating profit for the year ended August 31, 1907, was \$77,091.94. The bullion account due the company was \$472,624.42. The bonds for which the company is liable

amount to \$400,000, and interest to September 1 amounts to \$6,225.67. The net gain to the company as a result of the year's work, after the payment of all interest was \$45,441.56. The receipts from the sale of bullion for the year were \$374,286.74.

A loan of \$40,000, negotiated by the company shortly after the annual meeting of last year, has been repaid.

The company has purchased the Big Dipper and Euphemia Fraction mineral claims and has taken an option on the Commonwealth.

E. Dedolph, manager of the company's smelter, advised that between \$65,000 and \$75,000 be expended to increase the capacity of the smelter from 100 to 200 tons per diem. He said this would require the addition of three new roasters and 10 converters to the Huntington-Heberlein plant.

This proposition was opposed by James Finlay, manager of the Sullivan mine, who claimed it was unwise to expend that much money in increasing the capacity of the smelter, when the ore reserves were not known. He said the company did not yet know what it had below the 100-ft. level and he believed the company should sink a shaft another 100 ft., so as to find out whether or not the ore continues at depth, before any such increase should be attempted. He estimated there is enough ore in sight to keep the smelter going at its present capacity for ten months or a year. The stockholders decided that the company should sink the shaft to the lower level. The trustees will thereafter deal with the question of an increase in capacity of the smelter.

The meeting elected the following trustees: Judge George Turner, James Finlay, G. W. Van Dyke, George H. Hull, J. M. Armstrong, E. D. Sanders, Mose Oppenheimer, W. H. Shields and Alfred Coolidge. The only change made was in electing Mr. Coolidge in the place of F. J. Finucane.

Subsequently the trustees made the following appointments: President, George Turner; vice-president, J. M. Armstrong; treasurer, Mose Oppenheimer; secretary, D. A. Clement.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi—September: Shipped from the mine to Northport during the past month 6,855 tons of ore, containing 1,950 oz. gold, 3,200 oz. silver and 160,000 lb. copper. Expenditure on development work during the month, \$9,000. (Office note—As the copper content of the ore is not paid for until several months after the ore is sent to the smelter, it is practically impossible, in the present unsettled state of the copper market, to estimate the profits from month to month with any degree of accuracy. The directors believe it is wise to make a simple statement of the tonnage and contents of the ore such as is done by many other companies, and it is proposed in future to issue the returns in this form.)

Le Roi No. 2—September: Vancouver mine report: Shipped 120 tons concentrates. The net receipts are \$9,270, being payment for 100 tons concentrates shipped.

Tyce—September: Smelter ran 21 days, treating 453 tons of *Tyce* ore, value, after deducting refining charges, \$3,740; 3,983 tons of custom ore; total, 4,436 tons, producing a total of 501 tons of matte.

U. S. A.

Alaska Treadwell—August: 240-stamp mill ran 30½ days, 300-stamp mill ran 23½ days; crushed 76,548 tons of ore; estimated realizable value of bullion, \$87,617. Saved 1,492 tons sulphurets; estimated realizable value, \$78,818. Working expenses, \$87,372.

Alaska Mexican—September: 120-stamp mill ran 30½ days, crushed 21,218 tons; estimated realizable value of bullion, \$35,810. Saved 424 tons sulphurets; estimated realizable value, \$31,839. Working expenses, \$24,497.

Alaska Treadwell—September: 240-stamp mill ran 30½ days, 300-stamp mill ran 28¼ days, crushed 76,552 tons; estimated realizable value of bullion, \$76,815. Saved 1,454 tons

stamp mill ran 30½ days, crushed 21,250 tons; estimated realizable value of bullion, \$21,135. Saved 372 tons sulphurets; estimated realizable value, \$11,290. Working expenses, \$25,828.

DIVIDENDS.

by the Alaska Mexican Gold Mining Company, payable October 28; amount \$90,000. This will make total of dividends paid by this company to date, \$1,716,381.

A dividend (No. 78) of \$1 per share has been declared by the Alaska Treadwell Gold Mining Company, payable October 28; amount \$200,000. This will make a total of dividends paid by this company to date, \$9,635,000.

On October 7 the directors of the International Coal and Coke Company declared a dividend of 2 per cent., payable November 1. Heretofore the company has paid dividends of 1½ per cent. The dividend declared this month will amount to \$56,000, there being 2,800,000 shares of the company's stock issued, and 200,000 in the treasury. This month's dividend brings the company's total of distributed profits up to \$8,400,000.

NOTES.

The sixth annual meeting of the Pathfinder Mining Co., Ltd., was called for October 21, at Grand Forks, Boundary district.

In the matter of the Last Chance Mining Company (in liquidation) and the Winding Up Act—at Nelson, A. M. Johnson for Louis Pratt, the liquidator, has obtained an order for the sale of all the assets of the company.

The annual meeting of the stockholders of the Ark Group Mining and Milling Company was held at Ymir on October 1, when the following officers were elected for the ensuing year: J. J. Budd, president; D. E. Grobe, vice-president; O. G. Budd, secretary-treasurer, and N. J. Kneeland, auditor.

Slough Creek, Ltd., is applying for a grant of 500 inches of water to be taken out of Willow River, Cariboo district, about one mile below the mouth of Hardscrabble Creek; also for a grant of 500 inches to be taken from Slough Creek, about 2,000 ft. below the mouth of Nelson Creek. The purpose of these water rights is to furnish electric power for pumping, hoisting, lighting, etc., at Slough Creek mine.

The annual meeting of the Providence Mining Co., Ltd., was held at Greenwood about the middle of the month. At it the old officers were re-elected and a resolution was passed authorizing the directors to issue bonds to the extent of \$50,000, to bear 6 per cent. interest, the money so raised to be used for the purpose of sinking to the 1,000-ft. level of the company's Providence mine, near Greenwood.

The annual meeting of the stockholders of the Alaska Copper Company, owning mine and smelter at Coppermount, southeast Alaska, has been held at Seattle, Washington, U.S.A. Pittsburg shareholders submitted a plan for reorganization, and asked for a new board of trustees to manage the affairs of the company. The proposal was adopted. The new trustees are: A. P. Burchfield, H. W. Armstrong, H. Bryson, F. C. Lane, G. L. Bond, and W. J. Post, of Pittsburg; S. H. Moore, of New York; H. T. Granger, of Seattle; and S. L. Wood, of San Diego.

CERTIFICATES OF INCORPORATION.

Atlin Power Company, Limited, with a capital of \$25,000, divided into 5,000 shares of \$5 each.

Comox Valley Power Company, Limited, with a capital of \$10,000, divided into 100 shares of \$100 each.

Fire Valley Gold Mining Company, Limited, with a capital of \$1,000,000, divided into 1,000,000 shares of \$1 each. Objects include the purchase of the Evening Star, Rossland, and Mascot mineral claims, situated on Monashee Mountain, in Vernon mining division, about 50 miles east of the town of Vernon, Okanagan district.

divided into 1,000,000 shares of ten cents each.

Nelson Cement Works, Limited, with a capital of \$25,000, divided into 2,500 shares of \$10 each.

Pacific Mine & Lumber Company, Limited, with a capital of \$100,000, divided into 10,000 shares of \$1 each.

divided into 10,000 shares of \$1 each.

\$200,000, divided into 8,000 shares of \$25 each.

capital of \$250,000, divided into 250,000 shares of \$1 each.

COMPANIES REGISTERED IN ENGLAND

Kekewich, Smith & Kaye, 2 Suffolk Lane, E.C., with capital £5,500, in 1s. shares, to carry on the business of financiers, agents, traders, dealers in stocks, shares, and securities, etc. No initial public issue. The directors for the time being of the London & British Columbia Goldfields, Limited, are the first managers. Remuneration, 10 per cent. of the net profit.

London August 9, by Dalziel Fisher & Co., 56 Cannon Street, E.C. Capital £1,000, in £1 shares. Objects: To carry on in Canada and elsewhere the business of land and property owners and agents, miners, millers, smelters, etc. No initial public issue. The first directors (to number not less than two nor more than seven) are to be appointed by the signatories. Qualification, one share. Remuneration, as fixed by the company.

NOTICES IN BRITISH COLUMBIA GAZETTE

William Manson, of Nanaimo, to be gold commissioner and mining recorder for the Skeena River and Bella-Coola mining divisions, with office at Port Simpson, in place of John Flewin, resigned. Appointment to date from October 7, 1907.

Gillespie E. Stephenson, of Quesnel Forks, to be acting mining recorder during the absence of William Stephenson.

Carl Hairsine, of Hedley, to be a deputy mining recorder for the Similkameen and Osoyoos mining divisions, with sub-recording office at Hedley. Appointment to date from September 30, 1907.

Frederick William Valleau, of Hazelton, to be mining recorder for the Omineca mining division.

George A. Shade, of Port Essington, to be deputy mining recorder for the Skeena mining division, with sub-recording office at Port Essington. Appointment to date from November 1, 1907.

Alexander Lucas, of Kaslo, to be acting mining recorder for the Ainsworth mining division, during the absence of Robert James Stenson.

Prof. C. R. Corey, formerly of the Montana state school of mines, is now assistant professor of mining at the University of Washington school of mines.

Jay P. Graves, of Spokane, Washington, and associates are reported to be organizing a company to bore for oil in the Rosalia or Rock Creek region, 50 miles south of Spokane.

J. B. Tyrrell, of Toronto, Ontario, who for the past eighteen months has been mining engineer to Maskenzie, Mann & Co., is now prepared to do a general consulting business.

Dr. James Mackintosh Bell, director of the Geological Survey of New Zealand, has been spending a few weeks in Canada. It is stated that he will deliver a series of lectures at several United States universities before returning to New Zealand.

BOOK REVIEWED.

The Mineral Industry, its Statistics, Technology and Trade During 1906. Volume XV, Supplementing Volumes I to XIV. Edited by Walter Renton Ingalls. Pp. 954; illustrated. 6¼x9¼ in.; cloth, \$5. New York, 1907; Hill Publishing Company.

Contents. Aluminum. Alumudum. Ammonia and ammonium sulphate. Antimony. Arsenic. Asbestos. Asphaltum. Barytes. Bauxite. Bismuth. Borax. Bromine. Calcium carbide. Carborundum. Cement. Chromium and chrome ore. Coal and coke. Copper. Copperas. Corundum and emery. Cryolite. Feldspar. Fluorspar. Fuller's earth. Garnet. Glass. Gold and silver. Graphite. Gypsum. Iodine. Iron and steel. Lead. Limestone. Lithia. Magnesite and magnesium. Manganese. Mica. Mineral wool. Molybdenum. Monazite. Nickel and cobalt. Ocher and iron oxide pigments. Petroleum. Phosphate rock. Platinum. Potassium salts. Precious stones. Quicksilver. Salt. Silica. Silicon. Sodium and soda salts. Strontium sulphate. Sulphur and pyrite. Talc and soapstone. Tantalum. Tin. Tungsten. Uranium. Vanadium. Zinc. Literature on ore deposits in 1906. Improvements in sampling and assaying. The advance in ore dressing in the last decade. Progress in ore dressing and coal washing in 1906. Mineral statistics of foreign countries. Index.

The importance of this volume is evident from the great variety of subjects with which it deals. Its value is determined by the fact that not a few of its contributors are among the foremost authorities in America, and, in some instances, in the world, on the subjects with which they have dealt in its pages. The judgment of Dr. R. W. Raymond, the distinguished secretary of the American Institute of Mining Engineers, widely known as especially well-informed on mining and associated subjects, is that "taken as a whole, the contemporary picture of the mining industry, not only of the United States, but also of all other countries, presented in this volume, is unequalled—nay, unapproached—by any other publication in the world."

The editorial work was completed by Mr. Ingalls and his assistants by the end of May; the volume was issued at the end of July. It was, therefore, ready for publication at a comparatively early date. Its comprehensive statistics and summaries of information are more free from omissions and important errors than is usual where many tables and reviews have to be prepared. In the case of several foreign countries reliable statistics were not obtainable in time to be included, but as a rule the information given was brought up to the end of the year covered by the volume, which is, as a result, a great store of interesting and valuable information. As a work of reference it will be found especially useful to all seeking information relative to the great mineral industry of the world.

TRADE NOTES AND CATALOGUES.

The Canada Foundry Company, Limited, of Toronto, Ontario, has issued a 16-page booklet descriptive of the "Blackstone" oil engines, for which it is sole Canadian agent. The special advantages of these engines are stated, specifications and other particulars given, and several types of the engines illustrated. The booklet should be read by all interested in the power question and particularly by those requiring power for estate or farm work. It can be obtained gratis on application at any of the company's offices in Canada.

From the Canadian Westinghouse Company, Limited, of Hamilton, Ontario, have been received several circulars, as follows: No. 1092, "The Westinghouse Multiple Alternating Arc Lamp"; No. 1128, "Small Power Motors for Alternating and Direct-Current Circuits"; No. 1139, "Starting and Field Rheostats"; No. 1143, "Regulating and Reversing Controllers for Direct-Current Motors in Crane, Hoisting, and Similar Service," and No. 1144, "Westinghouse Mill Motors, for Direct-Current Service." These are all well illustrated, and

give descriptions and specifications of the several electrical appliances and apparatus mentioned in their respective titles.

The Jeffrey Manufacturing Company, of Columbus, Ohio, U.S.A., has just published "Catalogue D, Illustrating Coal and Ashes Handling Machinery for Power Plants." This relates only to plant and machinery designed and built by the company. The illustrations show numerous methods of handling ashes and the different styles of plant designed to meet particular conditions and in practical use under varying conditions. Elevators, bucket and belt conveyors, and grab buckets are prominent features in one or other of the many plants concerning which information is given. The catalogue will serve to emphasize the importance of using automatic devices so as to keep down operating costs and thus promote economy in directions frequently overlooked or neglected.

Mussens Limited, of Montreal, Quebec, Canadian sales agents for the machinery and plant dealt with in these publications, have sent out their own "Catalogue No. 11, Metallurgical Machinery," and that of Fraser & Chalmers, Limited, "Series G, Section 1. Copper Smelting Furnaces." The first-mentioned catalogue comprises practically everything connected with metallurgical operations—ore bin fittings, sampling mill machinery, furnaces of various kinds, bessemerizing plants, etc. Gold dredges, mills, gold-saving tables, concentrating and cyaniding plants, and much other machinery is also included. The Fraser & Chalmers catalogue deals comprehensively with different styles of smelting furnaces and their parts and fittings. This old-established manufacturing firm's works at Erith, Kent, England, have been greatly enlarged, and its operations considerably extended to meet the big demands made upon it for high class machinery.

Clients of the Westinghouse Machine Company, of East Pittsburg, Pennsylvania, U.S.A., have been assured by circular letter from the Receivers that there should be no occasion for apprehension because of the company's application for a receivership. The Westinghouse Machine Company is solvent and is doing a large and profitable business. The Receivers say: "It would appear that The Westinghouse Machine Company has been suffering from nothing more serious than a rapidly-growing and profitable business. This has necessitated the employment of considerable borrowed capital and credit throughout the country, the sudden withdrawal of which would have seriously interfered with the manufacturing operations of the company. There has not been even a momentary pause in the operations of the company, and the personnel remains the same as heretofore. There will be no departure from the general policy that has hitherto obtained in the conduct of the business."

INSPECTION OF INTERNATIONAL BOUNDARY MONUMENTS.

O. H. Tittman, superintendent of the United States coast and geodetic survey; Chas. D. Walcott, secretary of the Smithsonian institute; L. D. Burling, assistant curator of the national museum at Washington, D.C.; and Wm. E. King, chief astronomer in the astronomical branch of the Canadian department of the interior, are examining the boundary monuments placed along the International boundary line between part of the State of Washington, U.S.A., and British Columbia, from the Similkameen district east to the crest of the Rocky Mountains. These gentlemen represent the International Commission which has in charge the work of delimiting the boundary between United States and Canada, and their duty includes the examination of the boundary monuments and determining whether these have been properly placed. The new monuments have replaced old ones, and where necessary additional monuments have been erected. They are of aluminum bronze and bear two brass plates marked "Canada" and "U.S.," respectively. They are placed at all important points, at distances apart varying from one-half mile to two and one-half miles. Each is about 4 ft. 8 in. high, and is a miniature replica of the Washington monument.

COAL MINING NOTES.

The International Coal and Coke Company, Limited, operating coal mines and coke ovens at Coleman, southwest Alberta, has commenced the erection of 20 additional cottages for the accommodation of miners employed at its colliery. It is also engaged in the construction of a road and work of covering in the larry tracks from the mines to the tipple is in progress.

It is reported that satisfactory progress is being made in opening up the coal mine of the Royal Collieries Company, situated in the vicinity of Lethbridge, Alberta, and that a small quantity of coal is being shipped daily.

The Diamond Vale Coal Company is pushing ahead with development work on its coal property in the Nicola district. It expects to shortly have railway communication.

The *Fernie Free Press* states that 75 men arrived at Michel from Wales. They were brought across the continent in two special cars by the Canadian Pacific Railway. Another contingent was expected to arrive the following week. It keeps the company hustling to provide quarters for so many men temporarily until the new houses shall be finished.

The output of coal at the Crow's Nest Pass Coal Company's Collieries during October was, on an average, about 3,400 tons per day. Allowing for 27 working days this would give a total output for the month of about 92,000 tons.

Arthur Hickling, of London, England, one of the directors of the Vermilion Forks Mining Company, which is opening a coal mine at Princeton, Similkameen, recently said: "When the railway shall have been built to Princeton the marketing of the coal will be commenced. The coal is of an excellent quality, and it is believed it will make a market for itself in the Similkameen. The short haul will enable the sale of the coal at a fairly reasonable price."

The railway spur to the Nicola Valley Coal and Coke Company's mine is now completed. The spur is one mile and a half long from the Nicola branch of the Canadian Pacific Railway, and the cars of the railway company are now under the tipples. About 100 tons per day of coal is being taken out at present; so far the railway company is taking most of the output.

That conditions in the local mines have resumed their normal state, says the Nanaimo *Herald*, is evidenced by the fact that output record was again broken yesterday (October 12), this time no less than 1,826 cars or 1,429 tons of coal having been hoisted to the surface of No. 1 shaft. This is the record hoist for 9 hours in the history of the coal industry in Nanaimo, and is some tons greater than the record made by the Western Fuel Company on January 29, 1903, in two eight-hour shifts. Yesterday's output was only exceeded twice when the mines were under the management of the New Vancouver Coal Company when coal was hoisted during 16 hours of the day. On October 12, 1899, the output for the two shifts was 1,472 tons and on April 11, 1901, was 1,431 tons.

A press despatch from Ravensdale, Washington, dated October 10, said: As a result of a fire in the big mine of the Northwestern Improvement Company, which belongs to the Northern Pacific railway, all work has been abandoned for the time being and it may be a month or six weeks before operations can be resumed. This is the first fire in the Ravensdale mine, and beside curtailing the fuel output for some time it will throw 450 men out of work.

The steamer "Tellus," while on her way to Portland, Oregon, with coal from Nanaimo, Vancouver Island, was wrecked. She was under charter to the Western Fuel Company and carried nearly 4,000 tons of coal, valued at about \$20,000, for the Independent Coal & Ice Company of Portland. Both vessel and cargo were insured.

John E. Green, of the Carbonado Coal Mining Company, was in New York during October.

mining property in the Cowichan district.

Carl H. Hand, of Butte, Montana, U.S.A., was at the Kraso mine, Ainsworth, during the month.

J. T. Green, of Butte, Montana, U.S.A., recently looked over Voigt's group, on Copper Mountain, Similkameen.

H. H. Watters, manager for the Slough Creek, Limited, has gone to London, England, on a visit.

Otto Brener of Dawson, a well known mining man, came down from the Yukon early in October. From Vancouver he proceeded to Ottawa, en route to New York.

A. N. C. Treadgold, who left Dawson, Yukon, late in September, has gone to London. He took with him to England five malamute dogs.

J. D. Kendall, of London, England, who is consulting engineer for several mining companies operating in British Columbia, arrived in Canada on October 6.

Howard W. DuBois, of Philadelphia, was in San Francisco early in October on his way from the Cariboo district of British Columbia to Nevada.

B. P. Little, superintendent for the Diamond Vale Coal and Iron Mines, Limited, operating in the Nicola Valley district, was in Vancouver last month.

Thos. R. Stockett, of Nanaimo, general manager of the Western Fuel Company, went to Seattle, Washington, on business towards the end of the month.

E. H. Macdonald, of Butte, Montana, U.S.A., has been examining the Chicago group of mineral claims, situated near Cody, Slokan.

W. Stephenson, mining recorder at Quesnel Forks, Cariboo district, has returned home after having spent a vacation on the coast.

James Rutherford has been examining mining properties situated near Barkerville, Cariboo district, for a Scottish syndicate.

John Mitchell, president of the United Mine Workers of America, has been seriously ill, but is now reported to be recovering.

J. W. Bryant, mine superintendent for the Tyee Copper Company, recently went North, accompanied by W. M. Brewer, to examine some mining property.

H. Harris, late superintendent at the Alaska Smelting and Refining Company's smelter, Hadley, Prince of Wales Island, was in Victoria at the end of October.

F. C. Merry, superintendent for the Ferguson Mines, Limited, owning the Silver Cup and other silver-lead mines in northern Ladreau, was a recent visitor to Kaslo on business.

R. W. Coulthard, of Fernie, East Kootenay, general sales agent for the Crow's Nest Pass Coal Company, Limited, recently made a business trip to the chief towns of West Kootenay and the Boundary.

Signor A. Tealdi, of Florence, Italy, lately completed a tour through the Kootenay and Boundary mining districts. He was reported to be representing Italian capitalists desirous of obtaining suitable mining properties in the West.

R. W. Brock and W. H. Boyd, of the Geological Survey of Canada, left Rossland on October 4 on their return East. Mr. Brock has since resumed his winter duties as professor of geology at the School of Mines, Kingston, Ontario.

Charles Biesel, superintendent of the Snowshoe mine, near Phoenix, Boundary district, being operated by the Consolidated Mining and Smelting Company of Canada, Banff, Alberta, about the first of October.

Col. W. S. Thomas, who represents the syndicate which has bonded a number of mineral claims in Whitehorse copper camp, spent a few days in Victoria and Vancouver before returning to the southern Yukon.

D. D. Cairnes, of the Geological Survey of Canada, who last month went East after having spent the summer in the Yukon, was married on October 12 at Kingston, Ontario, to Miss Florence Mary Fenwick of that city.

O. B. Perry, general manager of the Guggenheim companies operating in the Yukon and the Atlin district of British Columbia, was in Vancouver on October 16. He was on his way from the North to New York.

R. P. Williams, of Rossland, western representative of the Canadian Rand Company, Limited, of Montreal and Sherbrooke, Quebec, returned early in October from a business visit to the company's headquarters.

H. W. Turner, of Portland, Oregon, known on Vancouver Island from his professional connection with southeast Alaskan mining properties, was recently in San Francisco, California.

T. Moore Fletcher, an Australian mining engineer, has been visiting the Boundary district. He came to British Columbia from South America, whence he went for an English company.

G. B. Benjamin, manager of the Bull River Power Company, which is preparing to instal a power plant at Bull River, Fort Steele mining division, East Kootenay, recently went to Spokane, Washington, U.S.A., on a business visit.

George Wilkinson, manager of the Western Fuel Company's No. 4 Northfield mine, near Nanaimo, Vancouver Island, was married to Miss H. Harris at Nanaimo on October 23. Mr. and Mrs. Wilkinson will reside at Brechin.

John L. Howard, of San Francisco, California, U.S.A., president of the Western Fuel Company, was at Nanaimo at the beginning of October, when the company's new agreement with its employees went into active effect.

Andrew G. Larson, of Rossland, mining superintendent for the Le Roi Mining Company, returned to Rossland on October 9 from a trip to Colorado and other parts of the United States. Mr. Larson was away about a month.

Capt. Harry Johns, superintendent of the British Columbia Copper Company's Napoleon mine, situated at Boyds, northern Washington, is convalescent after his recent severe illness. He has gone to southern California to recuperate his health.

R. G. McConnell and F. H. Maclaren, of the Geological Survey of Canada, came down from Yukon Territory early in October, the season for field work in that section having ended for the year. They have gone to Ottawa for the winter.

Anthony J. McMillan, managing director of the Le Roi Mining Company, left Rossland for London, England, on October 30. He will probably be absent from the Province about three months, returning after the company's annual general meeting shall have been held in London.

Capt. T. H. Trethewey, formerly manager of the La Plata mines on Kokanee Creek, Nelson mining division, has resumed charge for a few weeks during the temporary absence of his son, W. J. Trethewey, who succeeded him as manager and is now away on sick leave.

J. R. Bottroff, secretary-treasurer of the Elwood Tinworkers Gold Mining Company, of Elwood, Indiana, U.S.A., reached Camboe, northern Lardeau, about the middle of the month, with the object of ascertaining what progress had been made at the company's Silver Dollar mine since his last visit.

C. J. Seymour Baker has returned to Barkerville, Cariboo, to spend a short time in that vicinity in which he is interested in gold-quartz claims. During the summer he visited the west coast of Vancouver Island, southern Yukon, and southern Oregon, to examine mines in those districts, respectively.

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Alfred Brown, and W. H. Green, Esq., M. P., stated that the latter company, the F. A. Brown, Ltd., was established in 1908, and has since that time been operating in the Telkwa River valley in the mining division.

W. F. Copeland and John F. Newman, both of whom are from Bullion, Quesnel Forks, Cariboo district, early in October. Professor Newman was a student at Stanford University, California, and Mr. Copeland shortly afterwards went back to Bullion, where he is in charge of the property of the Cariboo Gold Mining Company.

R. J. McPhee, formerly manager of the Ottawa mine, in Sleean City mining division, is stated to be recovering from a long illness. When his condition became serious he was taken to Spokane, Washington, where he is now the benefit of skilled treatment and nursing in that city.

J. F. Robertson, for some months assistant to Frederic Keffer, engineer in charge of the mines of the British Columbia Copper Company, has removed from Greenwood, Boundary district, to Victoria Mines, Ontario, where he is on the staff of the Mond Nickel Company.

W. W. Leach, of the Geological Survey of Canada, at the close of his season's work in the Telkwa district and adjacent parts of the Skeena country, spent a few days at Vancouver and Victoria, and then proceeded to Ottawa, visiting the C. W. Nest Pass coal mining districts en route.

W. Fleet Robertson, provincial mineralogist, left Victoria on October 31 for Fernie to proceed thence to examine the mountain above the Coal Creek colliery, which had been reported in a condition regarded as threatening to life and property at and about the coal mines in its vicinity.

R. A. C. McNally, well known in the West Kootenay and Boundary districts, where he was provincial representative

of the West Kootenay Power and Light Company, Ltd., has been appointed hydraulic engineer of the West Kootenay Power and Light Company, Ltd., and has removed to Rossland. The latter company has acquired all the property of the former.

Thomas Kiddie arrived in Victoria from Hadley, southeast Alaska, on October 14 to meet A. J. McMillan, managing director of the Le Roi Mining Company. Later Mr. McMillan engaged Mr. Kiddie as manager of the Northport Smelting and Refining Company's smelting works at Northport, Washington, to succeed Albert E. Goodell who had resigned after several years' successful management of that establishment and its associated business.

W. J. Elmendorf, manager of the Arctic Chief mine, near Whitehorse, southern Yukon, left Whitehorse on October 23 for Portland Canal to examine the property of the Portland Canal Mining and Development Company on Glacier Creek.

On October 3 the Kasko Kootenian stated that a Colorado mining expert was inspecting the Argenta mine, which is situated on Hamill Creek, Ainsworth mining division.

Capt. John Hampson has returned to Nelson after having been superintendent of the Brown Alaska Company's Mamie mine, near Hadley, southeast Alaska, for nearly two years. Upon the company's affairs being placed in the hands of a receiver its several mines were closed. At the time of the suspension some shoots of good ore Captain Hampson had found in the lower levels of the Mamie were being opened up.

A. H. Kelly, of Nelson, has been visiting the Similkameen district.



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SYNOPSIS OF CANADIAN HOMESTEAD REGULATIONS.

ANY available Dominion Lands within the Railway Belt in British Columbia, may be homesteaded by any person who is the sole head of a family, or any male over 18 years of age, to the extent of one-quarter section of 160 acres, more or less.

Entry must be made personally at the local land office for the district in which the land is situate. Entry by proxy may, however, be made on certain conditions by the father, mother, son, daughter, brother or sister of an intending homesteader.

The homesteader is required to perform the conditions connected therewith under one of the following plans:

(1) At least six months' residence upon and cultivation of the land in each year for three years.

(2) If the father (or mother, if the father is deceased), of the homesteader resides upon a farm in the vicinity of the land entered for, the requirements as to residence may be satisfied by such person residing with the father or mother.

(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

Six months' notice in writing should be given to the Commissioner of Dominion Lands at Ottawa of intention to apply for patent.

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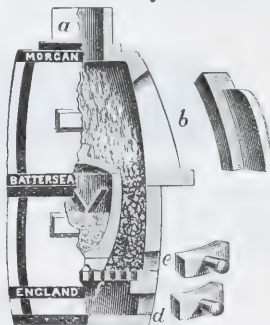
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NOTES AND COMMENTS.

The Westmont is stated to be a "coming" mining property in Slocan City mining division.

About 29,000 tons of ore have been shipped to the Crofton smelter this year from the Mt. Andrew mine, southeast Alaska.

More than 800 men have lately been employed in construction work on the extension of the Great Northern railway from Fernie to Michel, southeast Kootenay.

The place chosen for holding the fifth annual convention of District 18 of the United Mine Workers of America on December 11, was Lethbridge, Alberta.

Owing to low price of copper, shipment of ore from the Marble Bay mines, Texada Island, has been temporarily suspended, but development work is being continued.

The ninety-fourth meeting of the American Institute of Mining Engineers, for the reading and discussion of papers, will be held in New York City, beginning Tuesday evening, February 18, 1908.

~~Inadvertently an error was made in a footnote on page 413 of this number of the Mining Record, explanatory of the fact that the article commencing on that page had been reprinted from the Canadian Electrical Year and Progress, Toronto, Ontario, of an abstract of a paper read at a joint meeting of the Mechanical and Electrical Sections of the Canadian Society of Civil Engineers, held last May at Montreal, Quebec.~~

The output of the Crow's Nest Pass Coal Company's collieries during four weeks ended November 29 totalled 84,486 tons. This gave an average per day for 29 working days of 2,916 tons. The daily average for the last week of November, 1906, was 2,280 tons. The increase in output is therefore about 54 per cent. The aggregate of the company's payrolls for October at its three collieries—Coal Creek, Michel, and Carbonado—was \$205,416.

The Vancouver *Province* states that the Vancouver-Nanaimo Coal Mining Company is about to commence shipping coal to Vancouver and that the output for the present will be about 70 tons per day. It is asserted that "according to engineering authority there is one seam in which men are working that will furnish at least 1,500,000 tons, and the owners claim another seam will be brought to development of equal magnitude." The mine is about a mile from Nanaimo.

The dispute between the owners of Galt mine and their employees regarding the interpretation of the clause concerning the time of their work, has been settled. The board found in favour of the contention of the company, but Manager Naismith announced that offers made to the men previously still hold good. By the agreement the men will work eight hours at the place of work, but will be allowed pay for half-an-hour a day extra for the time taken going to and from work.

The wages dispute between the Hilcrest Coal Company of Frank, Alberta, and its men, which was investigated by the board of conciliation appointed under the Industrial Disputes Investigation Act, has been amicably adjusted by F. H. Sherman, district president of the United Mine Workers of America, and J. R. McDonald, superintendent of the Hilcrest mine, and an agreement has been signed on behalf of both parties. The members of the board of conciliation failed to agree upon a report that would be their unanimous presentation, so the dispute continued and a strike was threatened, but this has now been avoided and trouble of long standing removed.

The Tye Copper Company is building a wharf 210 ft. long with fixed and movable ore bunkers, and installing unloading appliances to be electrically operated. These are to facilitate the transfer to the smelter storage bins of ore arriving by sea from northern British Columbia, Yukon, and Alaska. An incline trestle runs from the wharf to ore bunkers near the sampling mill and blast furnace house, these having a storage capacity of 5,000 tons. A winding engine will haul ore, in trains of five cars each, about 1,200 ft. up to the top of the bunkers, the difference in elevation being about 80 ft. The improvements have been designed by Mr. W. J. Watson, manager of the smelter.

The members of the Miners' Union at Rossland, and of the Smeltermen's Union at Trail, have by more than the two-thirds vote requisite to authorize such change, voluntarily agreed to accept lower wages than have been paid at these places, respectively, since last July. This action has been taken by the unions to ward off a probable suspension of work had there not been a reduction in operating costs, it having been generally understood that the mining and smelting companies would not long continue opera-

tions under prior existing conditions of high prices of labour and materials, and lower market values for copper and silver. The action of the men in voluntarily meeting the situation in such a practical way, appears to warrant confidence that there will not be the general shut-down of the larger mines in the Kootenay district that had been feared.

Following the general description of the mining property of the Portland Canal Mining and Development Company, Limited, printed in the *MINING RECORD* for September last, a copy of the report on that property of a well-known mining engineer appears on pp. 437-9 of this issue. This will serve to indicate the conclusions of an acknowledged authority on such matters. Unfortunately, when the claims were visited quite recently, the surface outcrops of mineral were hidden by snow, and the development work done was not extensive; still it would seem that sufficient was seen by the visiting mining engineer to warrant him in concluding that the property is a promising one and meriting further development. This is encouraging for such a comparatively new and unproved mining field as the Bear River section of the Portland Canal district necessarily still is.

A handsome souvenir of the Ontario meeting of the members of the American Institute of Mining Engineers held in Toronto last July and their subsequent tour through the districts of Cobalt, Sudbury and Moose Mountain, has been published by the *Canadian Mining Journal*, of Toronto. The stated object had in view in preparing the volume was to commemorate an important and pleasant event. In addition to a summary of the proceedings of the three days' session in Toronto, an account of the tour through the districts above-mentioned is included, together with historical sketches of Cobalt and Sudbury. The volume is freely illustrated with half-tones of numerous well-known men and of places visited; also with maps and several beautifully-finished representations of specimens of ore depicted in natural colours. The souvenir is one worthy of the occasion, and the spirit and enterprise that prompted its publication merit hearty commendation.

Two sections of what has for years been known as the Geological Survey of Canada have been transferred to the "Mines Branch" of the new Dominion Department of Mines, the higher officials of which are: Hon. W. Templeman, minister of mines; Dr. A. P. Low, deputy minister of mines; Dr. Eugene Haanel, director of the mines branch; Mr. R. W. Brock, acting director of the geological branch. Several months ago what was known as the "Section of Mines" of the Geological Survey, which dealt chiefly with mineral statistics, was transferred to the new mines branch. Now the sections of chemistry and mineralogy have been similarly dealt with. The staffs of these several sections are not being maintained at their former strength, though, for Mr.

Elfric Drew Ingall, who had long been mining engineer to the Geological Survey, and Mr. Robert A. A. Johnston, assistant chemist and mineralogist, will remain with the geological branch, to carry on the geological work.

Official announcement has been made of the appointment as acting director of the Geological Survey branch of the Dominion Department of Mines of Mr. Reginald W. Brock, who has been employed in connection with the Survey since July, 1891. While the illness of Dr. A. P. Low is deeply regretted, there is much satisfaction, especially in the West, in which Mr. Brock has been actively engaged during the field-work seasons of seven or eight years last past, at this appointment to the vacancy caused by absence of the deputy minister of mines on sick leave. In the Crow's Nest Pass section of East Kootenay, in the Lardeau and Rossland sections of West Kootenay, and in the Boundary district Mr. Brock has done much useful and valuable geological work, so that British Columbia in particular is to be congratulated upon having so good a friend at the active head of the Survey. The MINING RECORD joins in the hearty congratulations extended to Mr. Brock.

Speaking at Winnipeg, Manitoba, of his visit to the collieries of the Crow's Nest Pass Coal Company at Michel, Coal Creek, and Carbonado, the late president of the company, Hon. Senator Cox, said: "Four additional mines are now being opened. Every effort will be made to as soon as practicable double the present output of the company's mines, which is between 3,000 and 4,000 tons a day. The company is just now handicapped by not having sufficient men, but we are endeavouring to bring more in from various parts. We have in Wales an agent who is engaging all the available men he can obtain for us, and these are being sent to British Columbia under contract for so many months. We do not employ any Oriental labour; not a single Oriental is to be found among the 3,000 men employed in and about our mines. There is scarcely any of our coal sold east of the Rocky Mountains. Almost all of our entire output is used by the Canadian Pacific and Great Northern railways and in making coke for the smelters."

The approximate production of the several mines and the smelting works of the Consolidated Mining and Smelting Company of Canada, Limited, during the calendar year 1907 (December estimated) was as follows: Centre Star-War Eagle group, Rossland, 132,316 tons of ore of an average assay value of gold 0.4 oz. per ton, silver 0.38 oz. per ton, and copper 0.7 per cent. Snowshoe mine, Boundary district, 125,000 tons of ore of an average assay value of gold 0.06 oz. per ton, silver 0.3 oz. per ton, and copper 1.4 per cent. St. Eugene mine, East Kootenay, 23,324 tons (practically all concentrate), containing 27 oz. silver per ton and 58 per cent. lead. About 6,500 tons of

low-alloy concentrate was shipped to Europe and nearly 1,000 tons to the company's own smelter at Trail. The approximate total value of the metal produced at this smelter was \$4,982,000, as compared with \$3,500,000 for the same year ending June 30, 1907. These totals include value of metal contents of custom ores as well. The grand aggregate of production of the smelter from March, 1898, to date is about \$15,000,000.

After having spent five months, chiefly on Vancouver Island, in examining claims on which the occurrence of iron ore had been reported, Mr. Einar Lindeman, the Swedish iron expert employed by the Dominion Department of Mines to investigate the iron resources of Vancouver Island and vicinity, has returned to Ottawa to prepare his report to the minister of mines. While before leaving British Columbia Mr. Lindeman did not give out for publication much information regarding the results of his labours, he did not hesitate to say that he had seen four properties he considered promising. More than this he would not commit himself to for, as he explained, the ore deposits have not been sufficiently developed to warrant him in giving assurance that they are large enough to be considered of much commercial importance. The properties he regarded as promising were one at Head Bay (Nootka Sound), one at Klah-anch River, one at Quinsam River (Campbell River district)—all three on Vancouver Island—and one on Texada Island. The last is owned by the Puget Sound Iron Company, which during 1907 had taken out from its Lake claim about 1,000 tons of iron ore for shipment to the furnace at Irondale, near Port Townsend, Washington. The quality of the ore from several of the properties was pronounced by Mr. Lindeman to be excellent for the manufacture of iron and, in some instances, of steel, but as to the other indispensable requirement—that of quantity—only extensive development can prove its existence. The foregoing seems to sum up about all there is warrant for saying definitely concerning commercial iron ore on the Coast under existing conditions.

From a published abstract of the annual report of the Le Roi Mining Company, prepared for submission to the eighth ordinary general meeting of its shareholders, the following information has been taken: During the company's last fiscal year, ended June 30, 1907, there were mined and shipped to smelters at Northport and Trail 131,696 tons of ore of an average value of \$10.15 per ton (1000 lb. ton) a net profit of \$3,582 (approximately \$17,000) was derived, after writing off \$22,690 for development and \$7,766 for depreciation (together approximately \$152,000). The balance sheet shows the liabilities of the company at the close of the fiscal year to have been \$45,329 and the value of the liquid assets \$119,581, thus showing an excess of assets over liabilities of \$74,252. The balance to credit of profit and loss, including \$10,000, brought forward, was

£154,509, and the cash in hand £10,360. Comment was made as follows: "The falling off in the metallic contents of the ore was particularly noticeable in regard to the gold values in certain portions of the mine, but, as Mr. McMillan (the managing director) points out, fluctuating values in ores of apparent similarity have been frequently experienced in the property. An important work undertaken during the year has been the sinking of the main shaft from the 1,350- to the 1,650-ft. level. This will enable the lower levels of the mine to be thoroughly explored and opened up, and already large bodies of ore have been exposed at these lower depths, leading to the hope that higher grade ore will be encountered as work proceeds. It is satisfactory to note that operating costs have been reduced from \$10.50 to \$10.02 per ton—a noteworthy achievement, having regard to the labour troubles that have been experienced in every British Columbian mining camp."

The second annual report of the Consolidated Mining and Smelting Company of Canada, Limited, was submitted to a general meeting of shareholders held in Toronto, Ontario, on November 28. The accounts cover the company's financial year ended June 30, 1907. The managing director's report shows that after writing off \$91,705.50 depreciation upon plant and equipment, there remained an operating profit of \$484,676.07. Adding the sum of \$70,914.93 brought forward from the preceding year the balance at credit of Profit and Loss was \$555,591, which was disposed of as follows: Held for claims awaiting adjustment, \$20,000; in payment of four quarterly dividends at the rate of 10 per cent. per annum, \$480,005; balance carried forward, \$55,586. It was explained that the profits of the company for the year under review had been unfavourably affected by two strikes in the coal fields which shut off the fuel supply from the mines and smelters, the very severe winter of 1906-7, and the unsettled and unsatisfactory labour conditions, all of which greatly restricted the mining, smelting and refining operations of the company, and resulted in increased costs as compared with the previous years. The production of the several mines of the company was as follows: Centre Star and War Eagle, Rossland, 81,788 tons of ore containing 32,306 oz. gold, 27,808 oz. silver, 1,030,529 lb. copper, total value \$893,249; St. Eugene mine, Moyie, 127,645 tons of ore (making 24,737 tons of concentrate) containing 675,959 oz. silver, 29,391,389 lb. lead, total value \$1,713,933; Snowshoe mine, Boundary, 49,002 tons of ore containing 2,989 oz. gold, 16,171 oz. silver, 1,372,056 lb. copper, total value \$397,141; total value of production of all mines, \$3,004,323. The quantity of ore, including custom ores purchased, smelted at the company's works at Trail was 222,573 tons, containing 69,168 oz. gold, 1,100,271 oz. silver, 20,383,083 lb. lead, 3,443,310 lb. copper, total value \$3,786,146. The report will be reprinted in the next issue of the MINING RECORD.

BOARDS OF TRADE CONVENTION IN SOUTHEASTERN BRITISH COLUMBIA.

THE ANNUAL CONVENTION of the Associated Boards of Trade of Southeastern British Columbia is to be held at Moyie, East Kootenay, about the third week in January. This annual gathering, which is attended by delegates from the various boards of trade of numerous towns in the most populous parts of the southern portion of the interior of the Province, deals with many matters of considerable importance, particularly to the commercial and industrial interests of the districts represented.

Among the matters more directly affecting the mining and smelting industries to be considered at the ensuing convention are the following: A recommendation that a change of the existing Dominion department of mines, which is associated with other departments under one minister, be made to an entirely distinct department having its own separate minister, a member of the Dominion cabinet; the continuance of the payment by the Dominion Government of bounties on iron, in western Canada even if discontinued in the East, the iron mining industry of the former not yet having been sufficiently developed to allow of its benefitting from the bounty system; the continuance of the lead bounty beyond the period now provided for, and the granting of similar aid to zinc mining; the establishment at Trail, British Columbia, of a gold and silver purchasing office, there being already in operation at the smelting works there of the Consolidated Mining and Smelting Company of Canada, Ltd., all plant and other facilities requisite for the smelting and refining of the precious metals; the offering of suggestions for adoption by the Dominion Parliament for making more effective the act for the settlement of industrial disputes, known as the "Lemieux Act"; and such other matters as shall be submitted by delegates in behalf of their respective boards of trade. The foregoing constitutes but a small part of the business to be brought before the convention, lumbering, fruit-growing, and other industries each having its own series of subjects to submit for the consideration and, if approved, action of the Associated Boards of Trade.

A recent visitor to British Columbia was Mr. Eugene Coste, mining engineer, of Toronto, Ontario, who is particularly interested in finding oil and asphaltum. Mr. Coste visited Vancouver, Victoria, and Nanaimo, and met in one or other of those cities a number of men well informed concerning the geology and mineralogy of the coast districts of this Province, among others Mr. W. Fleet Robertson, provincial mineralogist, and Mr. W. J. Sutton, the latter especially familiar with many parts of Vancouver Island. Mr. Coste intends returning to British Columbia later to further pursue his inquiries and investigations in this connection.

THE MINERAL PRODUCTION OF BRITISH COLUMBIA IN 1907.

By E. Jacobs.

IN MINERAL PRODUCTION 1907 appears to constitute a record year in British Columbia, estimates showing a higher total value than that of any previous year. Owing to the unavailability of this month's number of the MINING RECORD, it is practicable to print in it a

off the price of silver at 10 per cent. of that of lead. For coal and coke what was considered a fair market value in British Columbia was taken. Accordingly the respective prices were as follows: Lode gold, \$20.57 per oz.; silver (fine), 75 cents per oz.; lead (net), 4.8 cents per lb.; copper, 20 cents per lb.; coal, \$3.50 per long ton, and coke, \$6 per long ton.

For purposes of comparison, the following table, showing production over a period of four years, is submitted:

COMPARATIVE TABLE SHOWING QUANTITIES AND VALUES OF MINERALS PRODUCED IN BRITISH COLUMBIA, 1904-1907.

	1904.		1905.		1906.		1907.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Value.
Gold, placer	Oz.	\$ 1,115,300		\$ 900,700		\$ 944,300	\$ 700,000
Gold, lode	Oz.	222,042	4,589,008	238,660	4,933,102	224,027	4,630,639
Total gold		\$ 5,704,308		\$ 5,833,802		\$ 5,578,937	\$ 7,000,000
Silver	Oz.	3,222,481	1,719,516	3,439,417	1,971,818	2,990,262	1,897,320
Lead	Lb.	36,646,244	1,421,874	56,580,703	2,399,022	52,408,217	2,667,578
Copper	Lb.	35,710,128	4,578,037	37,692,251	5,876,222	42,990,488	8,288,565
Total metalliferous		\$13,424,335		\$16,149,464		\$18,432,502	\$16,678,883
Coal	Tons, (2,240 lb.)	1,253,628	3,760,884	1,384,312	4,152,936	1,517,303	4,551,909
Coke	" "	238,428	1,192,140	271,785	1,358,925	199,227	996,135
Other minerals (building materials, etc.)		600,000		800,000		1,000,000	1,200,000
Total production		\$18,977,359		\$22,401,325		\$24,980,546	\$22,461,812

review of the year's progress and approximate production (that for December being estimated), so rather than defer its publication it is included herein.

The official estimate of the total production of the Province for the year exhibits an increase over that of 1906 of \$758,437. The provincial mineralogist's published figures show production to have been, approximately, as under:

	Quantity.	Value.
Gold, placer		\$ 700,000
Gold, lode (oz.)	199,770	4,129,246

Total gold		\$ 4,829,246
Silver (oz.)	2,940,190	1,852,320
Lead (lb.)	48,309,660	2,318,864
Copper (lb.)	38,392,264	7,678,453

Total metalliferous		\$16,678,883
Coal (tons of 2,240 lb.) ..	1,856,600	6,498,100
Coke (tons of 2,240 lb.) ..	227,000	1,362,000
Other minerals— (Building materials, etc.)		1,200,000

Total production in 1907

In arriving at the approximate value of the several metals as shown above, the average market prices for the year, as published in the *Engineering and Mining Journal*, have been taken, with a deduction of 5 per

cent. off the price of silver and 10 per cent. of that of lead. For coal and coke what was considered a fair market value in British Columbia was taken. Accordingly the respective prices were as follows: Lode gold, \$20.57 per oz.; silver (fine), 75 cents per oz.; lead (net), 4.8 cents per lb.; copper, 20 cents per lb.; coal, \$3.50 per long ton, and coke, \$6 per long ton.

For purposes of comparison, the following table, showing production over a period of four years, is submitted:

It will be seen that while there has been a succession of increases in value of total production over the four years covered by the foregoing table, the differences have not all been the result of fluctuations in market prices. Placer gold (which is calculated at the same average price every year), for instance, is estimated to have been lower than in any other year since 1898. That there was a general decrease in production of metalliferous minerals in the Province is evident, when the quantities of the respective products are compared with those of last year. To the considerable fall in the price of copper during the later months of the year, however, may fairly be attributed the decreased production of copper, and, in smaller degree, that of silver and lode gold, since these metals occur generally in the copper ores of the Province, so are produced together with copper when the last-mentioned metal is being smelted from its ores.

The approximate total value of the production of metalliferous minerals in 1907 was, with the exception of gold, of 1906, \$18,432,502, as compared with 1906, though, there was a decrease of \$1,753,619. This loss was, however, more than compensated for in the considerable increase in the production of non-metalliferous minerals, chiefly coal, although coke contributed \$366,000, and building materials, etc.,

\$200,000 of this increase, the balance (\$1,946,000) representing the proportion from coal.

Taking the various minerals separately, as shown respectively in the tables of production, the following comments are made:

GOLD.

As already mentioned, the production of placer gold in 1907 was smaller than in any other year since 1898, and this notwithstanding that water conditions seemed, early in the season, to promise a favourable year for hydraulicking. It is possible that the revised figures, when the official returns shall all have been received, will prove the estimate now published to have been too low, yet while some gain may be made it is unlikely it will be sufficiently large to bring last season's production up to that of 1906.

The districts which produce most placer gold in the Province are Cariboo and Cassiar. In the former the Quesnel division had the assistance of the production of the property of the Consolidated Cariboo Hydraulic Mining Company, taken over two years ago by a Guggenheim company which recovered about \$20,000 against nothing for 1906, while the Cariboo division was understood to have had several properties at work that had been idle several previous seasons, yet preliminary advices record a decrease of about \$150,000 in the total recovery throughout both divisions of this district. Atlin camp, in Cassiar district, for years the largest contributor of placer gold in British Columbia, is also reported to have made a smaller production than during the three immediately preceding years—1904-1906—its decrease, as compared with 1906, being shown as approximately \$100,000. The production of individual miners from Atlin creeks has been steadily becoming smaller for several years, yet it was expected that the operations of the Ruffner, Hamshaw, Guggenheim, and other companies would have in the 1907 season more than made up for such loss. It is understood that the creek gravels suitable for hydraulicking are by no means exhausted, so that, given favourable conditions for working them, returns may be expected to show a substantial increase next season. Dredge mining in this camp has proved a failure, and has been abandoned for the time. Possibly it may be tried again later; if so, it should be by men thoroughly experienced in that class of mining.

The \$500,000 decrease in the value of lode gold was due to the smaller production of the Boundary and West Kootenay districts, and chiefly owing to a suspension of mining and smelting operations during two or three months of the year. The bigger gold-quartz mines of the Province did not contribute nearly so large a proportion of the total as might reasonably have been looked for. In fact, the only one that made anything like a good showing was the Nickel Plate in the lower Similkameen, with a production estimated at between \$400,000 and \$500,000. In Nelson mining division the Ymir mine made a small output as compared with its production of several years ago. On the other hand, the Queen,

Second Relief, Kootenay Belle, and Arlington, all in the Salmo-Erie section of this division, together produced between \$200,000 and \$300,000, and the Fern and Granite-Poorman, both within a few miles of Nelson, also added to the total. In the northern Lardeau, the Eva mine, near Camborne, was the only gold mine that made a production worthy of mention.

SILVER.

The production of silver was practically the same as that of 1906—not quite 3,000,000 oz. In round figures, West Kootenay produced about 1,300,000 oz., East Kootenay 950,000 oz., Boundary something like 600,000 oz., and the Coast district about 80,000 oz. While the decrease in quantity was not great, the expectation was that the change would be the other way, since in Lardeau district the Silver Cup mine made an appreciably large increase over its 1906 output, in Ainsworth several mines together did similarly, and in the Slocan the Whitewater in the camp of that name, and the Rambler-Cariboo, Ruth, Standard, Hewitt, Vancouver group, and Arlington, among others, all made a higher production than in the year immediately preceding. These gains, however, were insufficient to offset the decreases in East Kootenay and the Boundary. It is pleasing to note that there is believed to have been a distinct improvement in the Slocan, which is a change for the better not generally known to have taken place.

LEAD.

The estimate of production made by the Dominion official who has charge of matters in connection with the payment of the Government bounty on lead gives a total production of about 46,547,000 lb. as against that of the provincial mineralogist of practically 48,310,000 lb. While the latter has been carefully calculated, the returns are not yet in from all the lead-producing mines, consequently there may be the necessity later of reducing the quantity now shown as the approximate production. On the other hand, the former appears to have been based upon information obtained from the lead smelters of the Province, the output of which and the estimated quantity shipped abroad are indicated in the following preliminary figures:

From.	Lb. of Lead.
Hall M. and S. Co.'s smelter, Nelson....	6,329,243
Con. M. and S. Co.'s smelter, Trail....	21,686,078
Sullivan Co.'s smelter, Marysville, and others	10,631,036
Exported to United States and Europe...	7,900,995

Estimated production in 1907 46,547,352

Even should the revised figures, when obtained, confirm the provincial mineralogist's estimate, there will still be a decrease in value of this metal of \$348,714, of which, however, \$140,000 is attributable to the lower average price in 1907 as compared with that of 1906.

East Kootenay's production of lead was about 38,000,000 lb., the larger proportion from the St.

Eugene mine; the Sullivan was the only other important producer in this district. In the Shasta section of West Kootenay, the Whitewater was the largest producer with something like 2,500,000 lb. The Rambler-Caribee, Ruth, Ross, Bannock, Shasta, Sovereign, Standard, Vancouver group, and Howell

constituted a number of producers and a secondary source of smelting operations at the Trail smelter during a period in which there were labour difficulties in the country. But from that source, where came the supply of coke for a number of months with the production of silver and lead ores.



George Goldwin Smith Lindsey, K.C., of Toronto, Ontario, the new president of the Crow's Nest Pass Coal Company, Limited.

Mr. Lindsey has been a member of the Crow's Nest Pass Coal Company since its formation in 1904, and has held various official capacities. He has been on its directorate during practically the whole of that period and, as well has been the company's secretary and general counsel, third vice-president, general manager, and managing director successively. Recently he was promoted to the position of president in place of Hon. Senator Cox, resigned.

were other Sloean producers, while the Maestro and Spokane, in Ainsworth camp, the La Plata, in Nelson mining division, and the Silver Cup, in the Lardeau, also shipped a considerable tonnage of silver-lead ore.

The closing of the Hall Mining and Smelting

The closing of the Boundary district copper mines, and others in the Nelson and Coast districts, respectively, during several weeks of November and December, effectually prevented an increase in the year's production of copper over that of 1906. There was

also a restricted output during the spring, owing to a shortage of coke for the smelters and an occasional insufficiency of railway cars for ore and coke-hauling purposes. These adverse conditions resulted in a decrease of rather more than 10 per cent. in quantity of copper produced. If calculated at the average price for 1906 the loss in value would be nearly \$900,000, but as that for 1907 was about three-quarters of a cent a pound higher, the production for the latter year shows a net loss of only \$610,000. When it is remembered that nearly 75 per cent. of the year's production came from the Boundary district, the effect of the closing of its mines during two to three months becomes evident. Boundary's proportion of the total production of 38,392,000 lb. was nearly 28,000,000 lb.; Rossland and the Coast each produced rather under 5,000,000 lb.; Nelson division's share was somewhere about 400,000 lb. Of the 1,140,000 tons of copper ore shipped by Boundary mines those of the Granby Company contributed 625,000 tons, of the British Columbia Copper Company 235,000 tons, of the Dominion Copper Company 155,000 tons, and of the Consolidated Mining and Smelting Company 125,000 tons. Rossland camp's ore tonnage was about 280,000 tons, in the following approximate proportions: Consolidated Mining and Smelting Company's Centre Star-War Eagle group 132,000 tons, Le Roi 113,000 tons, Le Roi No. 2 223,000 tons, and sundry smaller shippers 12,000 tons. On the Coast the tonnage was approximately 100,000 tons, as follows: Britannia 57,000 tons, Tyee 12,000 tons, Outsiders 9,000 tons, Marble Bay 7,000 tons, Richard III 4,000 tons, Lenora 2,000 tons, and sundries 9,000 tons. The Queen Victoria, near Nelson; the Outsiders, at Portland Canal, and the Ikeda, on one of the Queen Charlotte Islands, were new producers, and the Richard III and Lenora, Mt. Sicker, Vancouver Island, resumed ore shipping after having been non-producers for several years.

IRON AND ZINC.

There was no considerable quantity of either iron or zinc shipped during 1907. On Vancouver and Texada Islands a few thousand tons of iron ore were mined and shipped to Irondale, Puget Sound, Washington, U.S.A. The most important event of the year in connection with the iron ores of the Province was the examination by Einar Lindeman, a Swedish iron expert, of a number of claims taken up for iron ore on Vancouver Island and vicinity, for the purpose of reporting on them to the Dominion department of mines, Ottawa, which engaged him with the object of ascertaining whether or not iron ores occur in suitable quantity, variety, and quality, on the Coast to warrant the expectation that an iron-manufacturing industry will eventually be established there. Mr. Lindeman's report has not yet been made.

Shipments of zinc ore and concentrate were not large, and those made were from Slocan mines, several of which are, however, continuing to store the zinc concentrates made in milling ores for silver and lead. The uncertainty as to the final decision regard-

ing the imposition of a duty on zinc ore sent to the United States remains an obstacle to much of this product being shipped to smelters in that country. A comparatively small quantity was exported to Europe from a Slocan mine. No recent progress appears to have been made in the direction of operating on a commercial scale the Canadian Metal Company's zinc smelter at Frank, southwest Alberta.

COAL AND COKE.

The production of coal in 1907 was the largest in the history of coal mining in the Province. The net increase over 1906 was 339,000 tons (2,240 lb.), this bringing the year's production of coal disposed of as such up to 1,856,600 tons. All three of the larger companies shared in this increase. There were about 357,000 tons made into coke. The respective approximate proportions of production were:

Company.	Gross. Tons of 2,240 lb.	Net. Tons of 2,240 lb.
Wellington Colliery Co.—		
Extension mines ..434,000		
Comox mines .....391,000		
	825,000	795,000
Western Fuel Co.—		
Nanaimo and Northfield mines	500,000	500,000
Total for Vancouver Isl.	1,325,000	1,295,000
Crow's Nest Pass Coal Co..	877,442	550,600
Nicola Coal and Coke Co..	11,000	11,000
Total production in 1907..	2,213,442	1,856,600

The Nicola Coal and Coke Company has been operating only about a year, and most of its comparatively small production was of coal taken out in opening its mine. Several other companies will shortly be in a position to mine coal in quantities up to a few hundred tons a day each.

The coke output of the year was 227,000 tons—210,000 from the Crow's Nest Pass Coal Company's ovens at Fernie and Michel, and 17,000 tons from the Wellington Colliery Company's ovens at Union, Vancouver Island. In this year's estimate coal has been valued at \$3.50 a long ton and coke at \$6. In other years the respective prices were taken as \$3 and \$5, but the former are now considered by the provincial mineralogist as average local market values for 1907.

BUILDING MATERIALS, ETC.

Activity in building operations in the larger cities of the Province had the effect of increasing the production of building materials—stone, brick and lime. An increase was also made in the quantity of Portland cement manufactured, the Vancouver Portland Cement Company's works near Victoria, Vancouver Island, having been enlarged and its output of cement considerably increased.

The official returns of exports of these materials to several Pacific Coast cities of the United States indicate a larger demand from that direction for the several varieties of excellent building stone occurring on the British Columbia coast.

Power Development of the Kootenay River for the West Kootenay Power and Light Company, Limited.

By ROBERT A. ROSS and RICHARD HOLMAN, Mechanical Engineers.

THE KOOTENAY RIVER rises in the northern part of Winnipegosis, in British Columbia, a short distance east of the head waters of the Columbia River, and flows southerly parallel to the north-flowing waters of the Columbia for 50 miles, thence through Fort Steele and across the International boundary into United States territory, flowing south and northwest for a distance of about 120

miles, after which it flows more easterly to its mouth in the Columbia. These measurements were taken in January, 1905, when the water in the river was lower than is sometimes experienced. The variations in flow of the river are very great but no measurements of maximum flow have been made as far as is known. The periods of high and low water differ from those of other well-studied North American



Lower Bonington Falls on Kootenay River, looking down from above.

miles. It then enters Canadian territory again, and soon expands into what is known as Kootenay Lake, which receives a number of small streams in its northern arm. The lake discharges by way of the west arm, at the western end of which is the town of Nelson; the river keeps a southwesterly course to its junction with the Columbia River at Robson. The total length of the river is about 350 miles, and the area drained by it and its tributaries, above a point 10 miles below Nelson, is some 9,800 sq. miles, of which 2,500 sq. miles are United States territory.

The minimum flow of the river at a point about

country, and, in the case of the Kootenay River, which largely depends for its supply from the masses of melting snow on mountains of great altitude, the high water period is comparatively late in the season, highest water being in June and July.

The power developed at the Upper Bonington Falls, the lower falls having been partially developed some years ago by the same company. The site for the development of the upper falls was chosen on the north bank of the river.

The channel between the Rocky Island and the north bank was made use of for approach and tail

race; the power house was built in the river, and a cofferdam was built from the bank to the island, thus unwatering the whole site and diverting the water to the south of the island. Although the natural channel assisted materially in the development work, yet about 40,000 cu. yd. of rock had to be removed to provide power house foundations and tail race. The removal of this rock was somewhat difficult, owing to the confined area in which the work had to be done, the difficulty of disposing of it, the nature of the rock (Nelson granite) and the irregularity in direction of the seams in the rock, some of which had to be excavated under water. As a large part of the concrete work admitted of the use of large stones, those most suitable for the work were piled up in convenient places for this purpose, and a large quantity was passed through crushers and used in the concrete.

The variations between high and low water above and below the falls do not correspond, the reason being that at present the flow of the river below the falls is restricted by a number of rocky islands. These hold back the flow of the stream, but it is the intention to improve this channel, so as to afford more channel area and more nearly equalize the rise and fall below the falls with the rise and fall above them.

Owing to these variations, which can never be entirely eliminated (except at a cost beyond commercial practicability), the vertical type of wheel setting was adopted, using all the head available at all stages of water, instead of adopting a head which would be nearly constant and which would involve the sacrifice of a large amount of power for periods when low water prevailed. Of course, when the natural head is least, the volume of water used is not important, as the quantity available is more than ample, but at periods of low water the head is greatest, and the vertical setting is an advantage, since it permits the use of the higher head. Had a horizontal wheel setting been adopted, the power house floor would have had to be set above highest water, and allowing the use of a draft tube of 24 ft. at this altitude, the tail water would have had to be maintained at a level above low water, which would involve the loss of head for a considerable period of every year when water was low and, consequently, when head was most valuable.

It is the intention to increase the natural head by building a timber dam across the river to a height that will drown the rapids above the fall, thus affording an increase of head of 10 ft., and the machinery and works are designed to meet this condition. This work will be done during the current year. There are no troubles from ice on this river.

It is possible to construct works at the outlet of the Kootenay Lake to maintain the lake level more nearly uniform, and thus to assist materially in reducing maximum discharge and increasing minimum discharge of the river below this point. This will render working conditions much better and increase

the potentiality of the river considerably. However, the matter has not yet been considered by the Government, though it would afford advantages of public benefit in the navigation of the lake, which is now, and will perhaps always be, a part of the transportation system of this district, owing to the great difficulty of constructing a railway from Kootenay Landing to Procter, located 17 miles above Nelson.

The power house is entirely of monolithic concrete construction, reinforced wherever necessary; the reinforcement consisting of round steel rods, and in some places of steel rails, which were used in parts of the structure under severe strain.

The water enters the flume through the submerged openings between the piers, and can be shut off by gates or by stop logs, the latter being provided for, so as to render the gate accessible in case of emergency. Behind the gates are the screens, which are thus rendered accessible for repairs or cleaning, if necessary. The water flows down the tube formed in the concrete to the wheels, of which there are three on each shaft, two discharging into the upper draft tube and one into the lower tube, uniting in a common discharge, which is placed below low water. The draft tubes are moulded in concrete and have no steel lining, being built up with the structure, cored openings in the monolith. Care was taken to secure a very smooth surface on the inside of all passages for water, and their curves and cross sections were designed to offer as little resistance as practicable.

The exciter turbines are similarly arranged, but are made to operate under a constant head by having the discharge at a higher level, which level is maintained by a weir.

The pressure pumps, governors, and low tension cables are all located in the chamber below the power house floor, the only machinery on the floor being the generators, controlling board and the low tension switches. The crane travels the length of the power house and over the railway track, so that all machinery can be handled from the car to place by the crane. Any leakage through the up-stream wall is taken care of in the air space and drained off.

The tail race openings are also provided with gates and stop logs, which can be closed, and any chamber can be emptied of its water by a system of drains and valves, leading the water from any one chamber to a well at the south end of the building, where a centrifugal pump throws it out into the tail race. The head water is admitted through a by-pass. The whole scheme provides the greatest facility for inspection and making of repairs when necessity arises.

In the transformer house the floor of the transformer room is at such a level as to permit of the transformers being wheeled on their own trucks from a flat car on the railway siding into place. The transformers are entirely separated from the switch room by a concrete wall, and the whole building is of concrete, including the partitions and barriers.

Owing to the peculiar location necessary for the

transformer and switch building in relation to the power house, it was necessary to throw bridges over a gap in the rock to provide foundation for the building.

As this work is the largest single piece of concrete construction yet built in the Province, it is satisfactory to be able to say that the whole of the cement used was manufactured in British Columbia, and successfully passed the rigid tests of the engineers prior to acceptance.

Hydraulic Machinery.—Each main unit is capable of delivering to its electrical generator 8,000

horsepower, 88 parts copper, 10 parts iron, and 2 parts zinc. Each is made in one piece, cast in cores and secured in the hole. The hole was made to enlarging the shaft at the points where the runners are attached, and heavy flanges are turned on the shaft above the hubs, to which the runners are securely bolted.

The upper and lower runners discharge in opposite directions into a common draft tube, the upper one discharging downward. The lower runner, like the upper one, discharges downward also, but into its own individual draft tube. The chamber



General View of Burrington Falls, on Kootenay River, (power house, built by British Columbia Electric Co., Ltd., with Power House erected in 1897-8, shown in foreground; Upper Falls in distance.

mechanical horse-power when operating under a head of 70 ft. of water and when running at a speed of 180 rev. per min. The quantity of water required per unit is 4,260 cu. ft. per sec. or a volume equal to the flow of a river 100 ft. wide, 5 ft. deep, and moving with a velocity of 151.2 ft. per min.

Each 8,000-h.p. turbine consists of three inward-flow Francis runners mounted on a vertical shaft, each runner being equipped with its own distributor and movable guide vanes. These distributors are bolted to heavy cast iron base rings secured to the masonry. The runners are thus mounted in concrete pits, which form the turbine wheel casings and the draft tubes for carrying the discharge water to the tail race.

The runners are made of special turbine metal

above the upper runner is by-passed to the draft tube, which relieves the pressure in the chamber, and thus eliminates the hydraulic thrust of this runner. As the other two runners discharge in opposite directions, the total resultant thrust on the shaft is theoretically zero. The thrust bearing, however, has been designed to take care of a generous amount of thrust over and above the dead weight of the revolving parts. The revolving parts consist of the rotor of the generator, the shaft in three sections, three runners weighing 4,000 lb. each, couplings and bolts, making a total of 170,000 lb. The thrust bearing consists of two specially close-grained cast iron discs. The lower disc is supported by a ball seat, while the upper is securely held in place by a locking ring not yet shown. The disc (not shown)

lips on the outside and inside circumferences, so as to form an annular pressure chamber, into which the oil is forced under a pressure of 250 lb., which lifts the revolving parts. When these parts are lifted the oil escapes between the surfaces of the discs, by this means supporting the total weight on a film of oil.

The thrust bearing is covered with a cover, fitted with glass peep holes. The oil is supplied to the bearing from a high pressure triplex pump, capable of working under a pressure of 500 lb. per sq. in. This pump is directly driven from the main turbine shaft by bevel gearing and counter shaft. Each turbine has its own pump, oil tank, piping, gauges, etc., which, in fact, is a complete system in itself, and independent of the governor system.

An extra motor-driven pump, with piping, has been provided, which is arranged to act as a spare for any one of the main units or exciters, but its primary use is to supply oil to the turbines when starting up.

The main turbine shaft is kept in alignment by three guide bearings. The upper guide bearing is built in conjunction with the thrust bearing. It is lined with Parson's white brass and is lubricated by oil supplied under pressure.

The intermediate and lower guide bearings, the former situated above the upper runner, and the latter between the intermediate and lower runners, are of lignum vitae, made by driving lignum vitae into the dovetail spaces in the bronze boxes. As these bearings are submerged, they are well lubricated with water and require little or no attention.

The water is distributed to the runners through malleable iron movable guide vanes finished smooth, so as to offer little resistance to the water. These vanes are operated by means of links from one side of the vane. The links are connected up to the vane operating ring. The rings are operated by rods and levers from a vertical shaft which leads to the operating deck, where the governor is located.

The revolving balls of the governor control a pilot valve attached to an equalizing lever. This valve operates a relay valve, which in turn controls the main operating piston, which is connected to the vane operating shaft.

An oil pump, a pressure tank, and the necessary piping is furnished with each governor.

In order to control the speed of the turbines from the switchboard, each governor is furnished with remote electric control.

The two upper sections of the main turbine shafting are joined together by a cast steel coupling 4 ft. in diameter. The brake mechanism is fitted about the coupling, the outer edges forming the brake band. Two brake shoes are applied on the brake band, and a hand mechanism is arranged so that a force of 10,000 lb. is brought on each brake shoe.

Each turbine is guaranteed to give an efficiency of at least 80 per cent. when delivering 8,000 h.p., and operating under a head of 70 ft. running at a speed of 180 rev. per min.

The hydraulic machinery is all the product of the I. P. Morris Company, whose hydraulic engineer, Mr. W. M. White, designed and carried out the work so successfully.

Electrical Development.—The general scheme of electrical distribution is so arranged that power can at present be delivered to Grand Forks, 69 miles distant, at 60,000 volts; Phoenix, 79 miles distant, at 60,000 volts; Greenwood, 83 miles distant, at 60,000 volts, and to Rossland, 32 miles distant (in the latter case over the existing lines of the old plant), at 22,000 volts.

It will be seen that owing to the complication involved in tying-in to the old plant two transmission voltages were required, and therefore transformers, switching apparatus, etc., had to be provided for both.

The whole of the power so far sold is used for mining work for large motor equipments, for the lighting and power of the mines, and the lighting requirements of the various mining towns above mentioned.

In addition, it is thought that the company will be able, at some time in the not distant future, to sell power to the railways in the vicinity of Rossland for operating, especially on the heavy grades necessary in attaining the elevation of the Rossland camp. The haulage over those grades at the present time is operated by steam locomotives of special type. In some cases these are geared, and switchbacks are established along the route in order to ease grades and for safety. As the heaviest grade does not exceed $4\frac{1}{2}$ per cent., this is quite within the capacity of a modern electric locomotive of considerably less total weight than the present steam machines, and as the advent of the single phase motor has rendered it possible to operate without the use of rotary converters or dynamo motor sets, the problem is much simplified.

Generators and Exciters.—The generators are four in number, each at 4,500 kw. capacity at 2,200 volts and 80 per cent. power factor, at a frequency of 60 cycles, being of the umbrella type and directly connected to vertical water wheels. Two units only are at present installed.

The exciters are two in number, each of a capacity sufficient to excite the entire equipment when finally installed. These are also of the umbrella type and directly connected to vertical wheels.

Generating Station Switchboard.—The current is carried at 2,200 volts to the bus bars, in compartments elevated above the station floor, and formed entirely of concrete, all parts being thoroughly barriered with the same material. The top of this bus bar compartment, in which all operating transformers are placed, forms the base of a platform, upon which are mounted nineteen 2,200-volt oil switches, all being motor-operated by distant control from the bench board.

The bench board, which contains the controls for the whole of the station, including the 2,200-volt switches, 20,000-volt switches, 60,000-volt switches,

together with the spindlers for the same reason is substituted in front of the instrument panel of the car and of the station, all connections thereof being enclosed in a protective jacket over 110 volts for safety.

The general switching arrangement has been worked out on the basis of the separate and distinct requirements that the supplied facilities of each busbar must be any transmission line or any bank of transformers.

The cables for connecting to the low voltage bus bars, and from thence to the transformer station adjacent, are all rubber covered and drawn into bituminous fibre ducts, which are embedded in the concrete floors, partitions, etc.

Both the transmission lines enter the tower and terminate in the high-voltage bus through the choke coils and disconnecting switches, and from there into the high-tension distant control equipment and into the low-voltage equipment.



Transformer Station.—The transformer station is arranged for four banks of 50,000-volt transformers, each transformer being of 1,875 kw. capacity, at 60,000 volts, and one bank of three transformers, each of 1,000 kw. capacity, at 20,000 volts, for interconnecting between the station herein described and the old development, which is distant about one mile; of these, two banks of 60,000-volt and one bank of 20,000-volt transformers have been installed.

All of the switches throughout the transformer house are motor operated and controlled from the bench board in the same station.

In every case live parts, such as wires, etc., are kept 3 ft. apart and 18 in. from all walls and bar-

being transformed in pressure from 50,000 to 2,200 or 440 volts, as required by the motor service.

tween lines and switches. For convenience in inspecting and cleaning the lightning arresters, etc., an elevated walk way has been provided in this compartment. All low tension cables are carried in fibre conduit set in concrete.

Low Tension Switchboard Room.—This room contains all the control apparatus for the high tension switches, etc., as well as feeder panels for low tension lines, also the storage battery for operating the motor-operated switches, motor generator set for charging the batteries, etc. One end of this compartment is reserved as a store room for supplies.

The construction of this entire plant was done by



Glimpse of part of Upper Bonnington Falls.

day labour under the supervision of the engineers. It was commenced in June, 1905, and water was admitted to the forebay December 24, 1906. Exciters were operated on December 29, and one of the power units went into commission on the following day.

We desire to acknowledge the assistance of Mr. John L. Allison, member Canadian Society of Civil Engineers, and of Mr. J. N. Smith, for the able assistance given in designing this work, and also the services of Mr. Geo. E. Revell, A.M.C.S.C.E., Mr. Walter J. Francis, M.C.S.C.E., and Mr. A. C. D. Blanchard, A.M.C.S.C.E., who at various stages of the work directed its construction.

According to Swedish newspapers, E. L. Rinnan, of Upsala, Sweden, has lately made an invention by which aluminum can be extracted from blue clay, the process reducing the price of the product four times. The silicic acid, which is latent in the clay masses, will also be utilized by the new method.

THE COAL RESOURCES OF ALASKA.

COAL IN ALASKA is receiving the attention of the United States Geological Survey. Some published notes on the progress made this year with the work of gathering information relative to the coal resources of that country are here reprinted:

The United States Geological Survey's investigations of the coal resources of Alaska have just been completed for the 1907 season and their results will probably be incorporated in a report on the coals of the Territory.

The work this year was in charge of W. W. Atwood, who was assisted by H. M. Eakin, and the investigation included an examination of the coal fields of Washington, made for the purpose of comparing the coals of that state with those of Alaska.

Work was begun in southeastern Alaska in May, on Kupreanof and Admiralty Islands. A topographic map was made of each field and careful geologic notes were taken. The structure and structural relations of the coal-bearing formations were determined and large collections of fossil plants and animals were shipped to Washington, D.C., for further study.

The remainder of the season was occupied in examining the coal in the interior of Alaska. This work was begun in the upper Yukon basin and continued to the head of the great Yukon-Kuskokwim delta. From Dawson to Holy Cross, a distance of nearly 1,300 miles, the party travelled in a canoe, making frequent stops and examining all coal deposits accessible from the Yukon River.

Coal has been mined at more than a dozen places along the Yukon, and at some of these places the mining has been profitable; but no extensive development of the coal fields in the interior has been undertaken and no work was being done on the coal claims of this region during the past summer.

Collections of fossil plants and shells from the Yukon Valley were made and forwarded to Washington.

Certain physiographic studies that were begun last year in connection with the coal fields were continued this season. These studies have now been carried from Seattle to Skagway, among the islands of British Columbia and southeastern Alaska, and thence over the mountains and through the interior basin to the mouth of the Yukon. Their results will probably be published in connection with the report on the coal resources.

There are good prospects of early development of the coal fields in the coastal districts west of Mount St. Elias, and it is probable that Alaskan coal will soon be shipped regularly to many ports on the Pacific coast.

The gold output of the Australian Commonwealth for the half year ending June 30 amounted to 1,594,859 oz., a decrease of 141,000 oz. as compared with the half year ending June 30, 1906.

STAR MINING AND MILLING COMPANY VS. BYRON N. WHITE COMPANY

Decision of the Court in Decision Extra-Lateral Rights Case.

EXTRA-LATERAL RIGHTS.—The litigation in the United States, and especially the mining industry of British Columbia, has not been hampered in any considerable degree by a similar case. At least two claims in this province have, however, attracted widespread attention among mining men, both here and in the United States, from the case of the Star vs. the

White Company. The decision of the Court has been awaited with more than ordinary interest. The case was before the court sitting at Victoria in April. The opinion, judgments of the case, however, the judges who constituted the court follow, with this exception that space restrictions have prevented the reprinting in these columns of the whole of that of Mr. Justice Irving.

(Continued from page 46)

"This is, in one sense, an appeal from the chief justice, but owing to the turn events took after he had delivered his judgment, we are called upon to



At Upper Burrage Falls, N. W. P., the site of the Star vs. White case.

which was before the Supreme Court of British Columbia in April, 1899, and that now under notice.

The history of the Star vs. White case is shown in the judgment of Mr. Justice Irving below. It would, therefore, appear unnecessary to here state more than that the Byron N. White Company owns two 600-ft. mineral claims, situated near Sandon, Slokan district, and that these claims are separated by two fractional claims owned by the Star Mining and Milling Company, represented by John M. Harris. The former were acquired under the old law, referred to on another page in this number of the *MINING RECORD*, which confers upon the owners of mineral claims located under it what are known as "extra-lateral rights."

and the case upon a claim in relation to him.

The plaintiffs, who are the owners of the Rabbit 1900 and White 1900 claims, obtained a writ on July 31, 1901, to restrain the defendants from trespassing on their claims, and for damages.

"The defendants justified the trespass complained of on the ground that they were entitled to the same under the provisions of the Act, 1891," which conferred upon them certain extra-lateral rights in respect of a vein shown through their two claims called the Slokan Star and Silversmith, respectively.

"The plaintiffs' case, as put forward at the trial held in February, 1904, was that this vein in respect of which the defendants claimed that extra-lateral

rights had been faulted' by a fissure vein near the westerly end line of the Slocan Star mine, and that the defendants' vein, instead of being a continuous vein, consisted of two separate and distinct veins, viz., the Slocan Star vein, broken as already stated at the westerly end of the Slocan Star claim, and the Silversmith vein; the connecting or intermediate portion running north and south, they said, was a fault fissure, which from the colour of its filling they called the 'black fissure.'

"There is also another section of the defendants' alleged vein to be mentioned, viz., that portion lying to the west of the so-called 'black fissure,' and connecting it with the Silversmith vein. This portion, the plaintiffs say, is not vein matter, nor mineralized in any way.

"The trespass complained of was committed in June, 1900, and consisted of taking ore from the stopes to the west of the end of the Slocan Star mineral claim.

"The defendants alleged in evidence that they were not aware that they had gone beyond their end line until October, 1900. At that date little or no work had been done on the Silversmith claim; on the Slocan Star claim the apex pits had not been continued to the northwest beyond pit 19; levels 1, 2 and 3 were as they are today; No. 4 tunnel had not been run into the Silversmith, nor had the upraise to pit 19 on the surface from No. 4 been run. No. 5 level had only reached a short distance into the Heber Fraction, say about station 21, and the winze was being sunk from the No. 5 level, below, for prospecting purposes.

"When therefore, the Slocan Star people were informed that they were outside of the westerly end line of the Slocan Star in an ore-bearing vicinity, we can assume that there was some consideration given as to how this apparent trespass was to be justified. The statute conferring extra-lateral rights which would justify them going outside of their side lines gave them no excuse for going beyond the end line of their claim. Their justification must therefore be sought in showing that they were following down on the dip of the Silversmith vein through the side lines of that claim; with a view to establishing this connection they, in the spring of 1901, commenced to trace the outcrop by digging the surface pits from pit 19 on, in a northwesterly direction so as to connect up, on the surface, the Slocan Star vein with the Silversmith vein, and in June they started to run No. 4 Silversmith tunnel in from station 48 in a southwesterly direction, and they continued to drift on their No. 5 level so as to connect the two claims underground.

"At the date of the issue of the writ, July 31, 1901, No. 4 level of the Star had reached station 18, the face of No. 5 level was at 21, No. 4 tunnel on the Silversmith would be in only some 100 ft. or so. Looking at case, as of that date, I cannot see that the defendants had at that time any evidence upon

which they could substantiate the defence which they subsequently set up, viz., that they, as owners of the Silversmith mineral claim, were entitled under the extra-lateral rights given to that claim by Section 31, to the veins or lodes in the Heber Fraction lying to the west of the Slocan Star end line. I think this is a fact of some importance, because work done after writ issued, or after trespass committed, should be scanned with some degree of suspicion. I do not want to press this principle too far, but in considering an argument put forward by the defendants' leading exponent, Mr. Elmendorf, in support of his contention that the Slocan Star was a continuous vein, viz., that the best proof of continuity was that the ore bodies in the Silversmith had been reached by the miners running No. 5 drift without any connection from above to guide them and no knowledge of where the ore existed (at 52-3 on No. 5 Silversmith) notwithstanding the very irregularity of form of the drift itself, one should remember that although the workings in a mine (Morrison, p. 417, cap. 318) made in mining operations and not in support of litigation, are generally important as evidence of any facts which may be inferred from them, that inference cannot be drawn with confidence where the work has been done after litigation for purposes of the action.

"After the writ was issued there was an application for an injunction and some affidavits filed. Those proceedings have been referred to in connection with Mr. Oscar White's credibility; as that matter will be dealt with later, it will be sufficient to state now, that in resisting that application, he, Oscar White, on August 31, 1901, made an affidavit that the total amount of ore taken from the ground claimed by the plaintiffs did not exceed the net value of \$500; and that Byron White in an affidavit of same date said the amount of ore excavated in all from the ground of the Rabbit Paw and Heber Fraction amounted to, in his belief, the sum of \$500. This statement by Byron White, as to value, was based on information furnished by Oscar White.

"In the autumn of that year the defendants discovered considerable ore in No. 4 Silversmith about 140 ft. from the portal, between stations 11 and 13. At that time the drift which was being run in a northerly direction from the Heber Fraction had reached station 29, on No. 5 level.

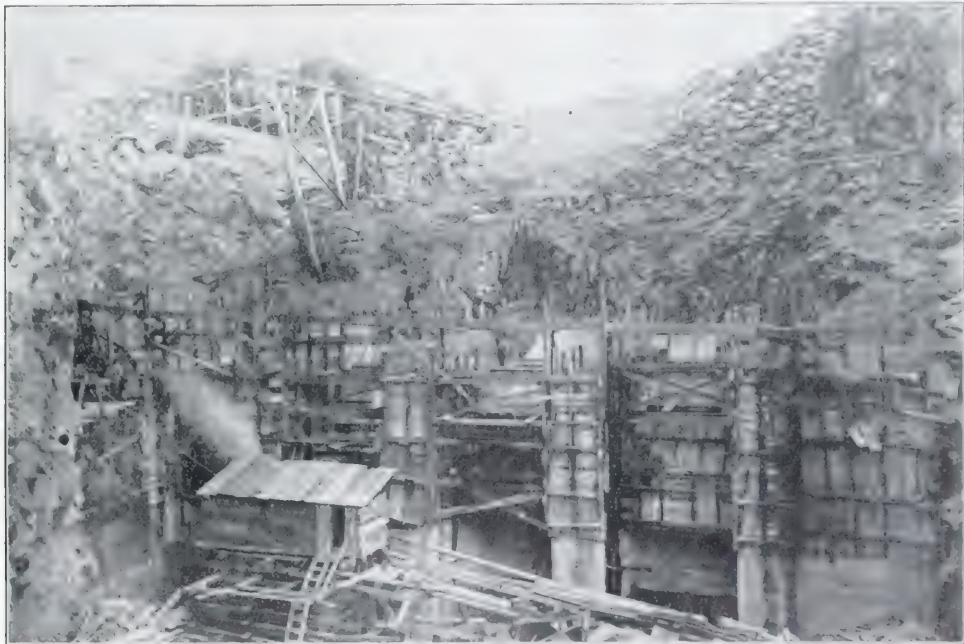
"The pleadings closed on November 25, 1901. They were of the most general character and gave no indication of the theory that the plaintiffs intended to set up at the trial, but, during the examination of Mr. Harris, for discovery, in October, 1903, before trial, an indication of the plaintiffs' line of attack was given. He then expressed an opinion that the Slocan Star vein instead of turning to the north continued on in a straight line across the porphyry dyke, and that the Rabbit Paw claim had in this way caught the Slocan Star vein. According to his theory the Silversmith vein was an independent

parallel vein some 850 ft. to the north. After the plaintiffs' experts had obtained inspection of the mine, etc., on February 4, 1904, the board had the Slocan Star vein continued through an adit, which was abandoned, and at the trial which opened on February 12, 1904, the new theory of a fault fissure occurring at the bend was set up.

"Their theory is that the defendants have, by turning the levels, run on the Slocan Star vein proper into the black fissure at the south turn, and at the north by following non-ore-bearing planes and the stratification of country rock have given to their No. 5 level an appearance of continuity on ore or in vein matter between mineralized walls from east to west where in fact there is no real continuity.

"When the trial opened on February 12, 1904, the defendants' open claim was that the vein had been and was continuous at the bend, and that the fault was in the dip of the vein and in the continuity of their vein; but the pleadings being vague, Mr. Bodwell found difficulty in dealing with his case.

"The names of the defendants are: Mr. Bruce White, the first superintendent of the defendants' mine; Mr. Oscar White, who succeeded Mr. Bruce White in October, 1898, and who was superintendent when the trespass complained of was committed; Mr. Cavanaugh, a relative of the Whites and an assistant in the defendants' mine;



At present, construction of the new drift is being made on the level of the drift.

"The plaintiffs say that the wall of material in which the defendants ran their drift between the winze and station B on the 5th level is the filling of the 'black fissure.' On the other hand the defendants say the drift on No. 5 level, between the winze and B, is in their vein, that the Slocan Star vein continues from the winze to B, and there turns. The filling, they say, is vein matter, and that its crushed appearance is the result of movement in the vein, but the movement has not interfered with the continuity of the vein, which they claim they have followed in their workings.

"The defendants contend that there may be a fault in the vein, but that a fault in the vein does not

Isaacson and Fox, two miners employed in the mine; Mr. W. S. Drewry, a land surveyor in the employ of the defendant company; Mr. Twigg, another land surveyor; two foreign experts—Mr. W. J. Elmen-dorf, retained in September, 1903, and Mr. Parks, retained in September 1904; and two local mine managers of experience in the Slocan district—Messrs. A. Sharp and M. S. Davys. With the exception of Mr. Twigg and two local mine managers, the others were interested, either by direct pecuniary interest or sympathy in the success of the defendants' case.

"The evidence of the defendants was directed to showing the unbroken continuity of the vein from

Sandon Creek to the westerly workings in the Silversmith claim. They represented that the hanging wall of the vein could be followed on No. 5 level very plainly all through (evidence of Parks; Elmdorf, however, was more guarded); that coming north they were following their own vein; that their vein turns to the west at B.; that at point C, the hanging wall crosses the drift from the left or south side to the north or right-hand side and comes out at D, and that their drift continues all the way from E to station 52, between mineralized walls.

"The plaintiffs' contention was that the Slocan Star vein was cut off by the 'black fissure,' which extended to the south and beyond the hanging wall of the Slocan Star vein, and that it was the 'black fissure' the defendants were following; that the 'black fissure' does not turn at B., but continues on to X.; that the material difference from the country rock that the defendants saw in running from B. to C. was 'black fissure' material which they had to break through; and that there is no connection on ore between B. and 52; and that the walls followed by them from B. to 52 were mere non-mineralized planes.

"On the opening of the plaintiffs' case, counsel stated that he would show that from the winze or turn at the south end of No. 5 level to X., at the extreme north, there existed a separate and distinct fissure, separate from the fissure containing the Slocan Star vein and separate from the fissure containing the Silversmith vein. It was not an ore bearing fissure, but contained a filling having for its main constituent a soft crushed slate, of dark colour, on account of which they had designated it the 'black fissure'; that in this fissure there was a 1,200-ft. barren stretch; that the line run by the defendants as their vein was formed by uniting these three fissures into one; that this union brought about the peculiar contortions shown in the northern and western parts of their level; that the defendants had neither walls nor ore to establish the continuity of their vein.

"Then, after the cross-examination of Mr. Sizer had proceeded a certain distance on February 25, counsel for the plaintiffs, referring to the issue of fact which had been gradually developed during the trial, and fully stated by Mr. Sizer, proposed that certain work should be done and that that work should determine the issue. This was agreed to in a more or less indefinite way, but the examination of witnesses proceeded. Like the evidence on behalf of the defendants it was, in the main, the testimony of experts and persons interested in the result, and at the close of it the judge seems to have felt that he was not then in a position to give a decision and that therefore some further work was necessary. It was accordingly arranged that some work should be done under the superintendence of Mr. S. F. Parrish, but owing to illness, Mr. Parrish had to resign, and so matters remained at a standstill until December, 1904, when the chief justice himself, accompanied

by the leading experts on each side, paid a three days' visit to the mine. This inspection by the judge accompanied by the experts, I see by the decree, was a consent arrangement. I think it is to be regretted that counsel did not also attend, for, instead of adhering to the plan originally agreed upon, viz., that work should be done to test the soundness of Mr. Sizer's contention that there existed three separate fissures, the chief justice thought it would be sufficient to enable him to reach a conclusion if a drift was run from C. to a point 27 ft. east of D., or as it has been called D. minus 27, that is, instead of testing Sizer's 'black fissure' theory, which test required a drift through the Star hanging wall, with cross-cuts at the south and a cross-cut at X (two experiments which Sizer said would either prove or disprove his theory) a wholly different piece of work was done. As to this work and why it was ordered at this particular place, I shall refer later. To the substitution of this one piece of work for that originally agreed upon, objection was taken at once by the plaintiffs. In January, 1905, while this new work, i.e., the drift from C. to D. 27, was being run, an application for other work was made, and that application was renewed in May, 1905, about which date the chief justice, accompanied this time by Mr. Oscar White, the defendants' superintendent, and Mr. S. S. Fowler, an expert retained by the plaintiffs, made a second examination of the mine. To both of these applications there was a refusal, with the result that on July 25, 1905, when the case came on again for what has been called the second trial, the work, for the doing of which the hearing in February, 1904, had been adjourned, was still undone. Once more the plaintiffs applied for further experimental work, but this was not granted and the trial proceeded and judgment reserved.

"At the close of the trial the same application was made for more experimental work with the same result; and in the end judgment was given in favour of the defendants.

"The learned chief justice proceeded on the ground that the 5th level shows that the vein was continuous and that between C and D 27 there was a clearly defined hanging wall and the characteristic vein filling which was to be found in the Slocan Star and Silversmith was to be found in the cross-cut run between these points by his direction in December, 1904.

"From that judgment an appeal was taken to this court and at the same time an appeal from the interlocutory decision refusing to allow the experimental work to be done was also taken. After argument this court came to the conclusion that the plaintiffs should have been allowed to have the work done which they contended was necessary for the proper presentation of their case, and we therefore set aside the judgment of the learned chief justice and directed the work to be done, at the places mentioned by Mr. Sizer in his examination in February, 1904.

"The parties to the action selected Mr. W. E.

Zinc as a proper reason to have the management of the work and mine time to be proceeded with and to have a full trial, and the same came on before us in April last.

"Some question has been made as to the convenience of the course adopted. Perhaps it has thrown on this side a greater amount of work than is proper, but it seems to me that the only satisfactory solution of the problem we have had to deal with, and as for precedent we have our own action in Hopper vs. Dunsuir, and also the Stanley Park case. And I see that the Judicial committee of the Privy Council has, instead of remitting a case to the court at Shanghai, allowed evidence (taken it is true on commission) to be presented to them in the first instance; see *Bank of China, etc., vs. American Trading Company* (1894) A.C., 271.

"Looking back now, I feel that we would have experienced the very greatest difficulty in following the complicated details of this case, if we had proceeded in the ordinary way.

"Before proceeding with the statement of facts of the case as developed before us, I would like to observe with reference to a contention mentioned by Mr. Bodwell, that he had a judgment in his favour and that it was for the plaintiffs to upset it. I do not look at it in that way. In our opinion the case before the learned chief justice had not been fully tried and therefore, we directed that there should be practically a new trial. It would be altogether out of reason to regard a judgment which had been reached, at any rate in our opinion, without full opportunity to plaintiffs to establish their case, as a judgment shifting the onus from the defendants, on whom it was originally cast, on to the plaintiffs.

"From the reasons for judgment given by the learned chief justice it is apparent that he relied very much on his own inspection of the premises and he was, after having made such an examination, able to decide which of the experts was right and which was wrong.

"Now, since then we have had the advantage of the additional work and verbal evidence on both sides, and although we should pay due regard to the opinion of the witnesses formed by the chief justice yet it is for us to form our own opinion as to their credibility.

"The new work consisted of three separate undertakings—one at the south where the plaintiffs had said the Slocan Star vein was cut off and terminated by the 'black fissure'; the middle piece where the defendants had asserted the No. 2 vein would be found, to which vein they attributed certain ore found in the 'black fissure', and the northerly piece of work which the plaintiffs had said, would demonstrate that the wall of crushed material did not stop or turn at B, but continued on to X and beyond.

"The new work at the south, in my opinion, completely established the theory contended for by the plaintiffs as to the separate existence of the 'black fissure.' It showed positively beyond question that

the fissure wall is not a level bed of ore, but a fissure with a filling similar to that found in the 'black fissure' on the north side. Mr. Elmendorf admitted that the plaintiffs had exposed by the new work a vein running parallel to the Slocan Star vein, and that it was not a level bed of ore, but a fissure running through the hanging wall of the Slocan Star vein. Mr. Elmendorf's first point was to the effect that justice on his first visit that there was no evidence of a fissure extending out to the south.

"The new work at the north, in my opinion, demonstrates beyond question that a fissure extends from B to X, and as it confirms the testimony given by the plaintiffs' experts on that point, I see no reason for not accepting their opinion that it is the same fissure which is exposed by the new work to the south. It completely disposed of the evidence given by the defendants' witnesses that the crosscut B to X was driven in country rock.

"Had the chief justice heard the testimony adduced before us I feel sure that he would not have felt confident in accepting Mr. Elmendorf's expert testimony as more reliable than that of Mr. Sizer. Mr. Elmendorf's action in persuading the chief justice not to accede to Sizer's request to have certain work done, in my opinion is cogent evidence of partisanship. An opinion on a technical matter formed under such guidance can be of little value and when in the light of subsequent evidence that guide admits he was mistaken, still less. I have no hesitation, therefore, in saying that in these circumstances we are not bound, in any degree, by the opinion formed at the view taken by the learned chief justice.

"The contention put forward by the defendants at the trial that the vein turned at B was also in my opinion disproved. Mr. Max Bohmer, a new expert introduced by the defendants on the hearing before us, thought that the real turn was at station 38, and that the vein indications seen in the neighbourhood of B, C and D were from fragments of the same vein; but his evidence has not shaken my confidence in Messrs. Sizer and Fowler, a confidence reached after hearing their oral testimony before us, and reading their evidence before the learned chief justice.

"In view of some of the expressions used by the chief justice in his reasons for judgment, I thought it proper to go through the evidence taken before him with very great care and to make some observations with regard to the witnesses examined before him.

"In considering that testimony it will be necessary therefore to refer to the evidence given at the trial before him in February, 1903, and again before him at what has been called the second trial, held in July, 1905, and also to the evidence given before this court in April, 1907.

(Note.—Here follows a long critical review of parts of the evidence of several of the chief witnesses. This part of the report is too long to be reproduced in full.)

states that he can place no confidence in Mr. Oscar White's testimony, giving reasons for this conclusion. Regarding Mr. F. L. Sizer he says: 'Before us Mr. Sizer gave his evidence in a satisfactory way and the conclusion I have arrived at with reference to him is that he is a close and accurate observer of facts and of good memory and not desirous of misleading the court.' The closing paragraphs of his lengthy judgment are as follows:)

"Mr. Fowler, a mining engineer residing in this Province since 1889, with nine or ten years' experience in the Slocan country, and who at one time was familiar with the workings of the Ruth mine, a mine only a few hundred feet to the north of the mine in question in this action, of all the witnesses, except Mr. Oscar White and Mr. Harris, whose experience in the Slocan country is also considerable, is, by virtue of his long familiarity with the surrounding country, entitled to speak with most weight.

"For these reasons, I think the defendants' case has failed. Judgment should therefore be reversed, with costs here and below. The judgment should direct an enquiry as to the amount of ore taken, and contain a declaration that the Slocan Star location does not give to the defendants any rights to the west of the west end line of that claim, and that the vein or lode on the Silversmith location has not been shown to extend to the Rabbit Paw or Heber Fraction. There should be an injunction also, but the term of the judgment had better be spoken to later."

JUDGMENT OF MR. JUSTICE MARTIN.

"Two questions are submitted by the plaintiff company (appellant) for our consideration, one of fact and one of law. If the former is determined in its favour the latter becomes immaterial; therefore I shall first deal with the former.

"At the outset I find myself in an unusual position, for though nominally sitting as a judge of appeal, yet this court has for many days been discharging the functions of a court of first instance, of a jury in fact, during the hearing before us (from April 8 to 23 inclusive) having taken a great mass of oral evidence, amounting, when extended, to 675 type-written pages.

"This from every point of view undesirable, and I trust not-to-be-repeated departure from the practice in the case of non-reception of evidence by the trial judge, places the parties and the court in a peculiar position, for we have no finding of fact to assist us because the evidence we took, and which is quite inextricably interwoven with that taken at the trial was not before the trial judge so the issues are open and must be found by us. Such an unusual state of affairs affects the case seriously because the usual onus thrown upon the appellant to 'show the judgment appealed from is wrong' is absent (see *Inverarity vs. Hanington*, April 27, 1907, not yet reported, and the authorities therein cited), and, on the other hand, the original onus cast upon the defendant in actions of this pecu-

liar class to justify its encroaching workings is as strong as ever, and as important.

"The extent to which this latter onus goes in cases of this nature has been considered in many American cases to which we have referred and which we must look to for guidance since this difficult and distinct branch of our mining law came direct from that country, and there has been some difference of opinion in applying it to various circumstances. But in a case such as the present I adopt the following remarks of Hallett, J. in *Leadville Mining Co. vs. Fitzgerald* (1879) 4 Morr. Min. R., 381, cited in *Lindley on Mines*, 2nd edition, Vol. 2, Sec. 866, wherein the whole question is ably considered: 'Within the lines of each location the owner shall be regarded as having full right to all that may be found, until some one can show a clear title to it as a part of some lode or vein having its top or apex in other territory. In other words, we may say that there is a presumption of ownership in every locator as to the territory covered by his location, and within his own lines he shall be regarded as the owner of all valuable deposits until some one else shall show by preponderance of testimony that such deposits belong to another lode having its top or apex elsewhere.'

"In *Snyder on Mines* (1902) Vol. 2, Sec. 783, it is, I think, accurately stated after a review of the cases: 'While, as we have seen, this extra estate is given to every locator of a mineral vein and confirmed by the patent, if he obtains one, it is strictly upon the condition that he so establish his lines upon the surface as to include whatever portion of his vein he desires to mine outside the vertical planes of his surface ground, for however right or wrong the law may be, and notwithstanding there is a severance of estate, as we have seen, the rule is firmly established that the common law maxim applies, and that agreeably hereto until a better right is shown, he who owns the surface is presumed to own all beneath.'

"And in *Barringer & Adams on Mines* (1900) the conclusion is reached (pp. 442-3) that: 'The presumption in the first place is that all minerals found within his boundary planes belong to the owner of the claim. And upon a stranger claiming the right to mine inside of these planes rests the burden of proving that he is mining upon the dip of a vein whose apex is outside the claim, and within a claim belonging to him. That is, in order to establish his right and justify the apparent trespass, he must prove that he is the legal possessor of the vein which he is following. If he fails to establish both of these points he is a trespasser.' And see also p. 458.

"The circumstances of the case at bar are such that, as *Lindley* says, Sec. 866, p. 1592, 'It devolves upon the defendant company to establish: (1) the existence of an apex within the boundaries; (2) the identity and continuity of the vein from its top or apex within such boundaries to the point of dispute.'

"In regard to No. (2) *Lindley* observes, Sec. 615,

p. 1117: "The legal identity or continuity of a vein or its different courses, as well as its true mineral source, underlie the surface of adjacent lands presents at times the most serious questions encountered in the administration of the mining law. It is impossible to prescribe any definite rule as to what degree of continuity or identity in a legal sense the miner must establish when he invades property adjoining the location containing the apex of the vein. Each case presents its own peculiar facts. Reports of adjudicated cases rarely present general discussions of this feature of the mining law, nor are the facts usually stated with such detail as to enable the practitioner to utilize the case as a precedent. The infinite variety of structural conditions encountered in the practical operation of mines renders it highly improbable that a case in one locality can be safely relied upon as a precedent in a case arising in another place."

"And he goes on to discuss certain general principles as illustrated by leading cases. At a trial of this kind in the American courts three questions of fact are left to a jury, and the judge's charge is frequently given in full in the law reports. Our duty therefore, acting as a jury, is to charge ourselves on the facts before us and return a verdict thereon. In such circumstances, as I have before now stated, I do not think it is a good practice or otherwise profitable to attempt to give here a critical analysis (and anything short of that would be quite useless) of all the great mass of conflicting evidence of fact and theory that has been adduced, and on this point I refer to *Leadbeater vs. Crow's Nest Pass Coal Co.* (1904) 2 M.M.C., 145, wherein I said in a coal mining case: 'In support of these conflicting theories a great body of evidence was adduced in a trial lasting more than three consecutive weeks, and even if it were desirable for me to do so when discharging the functions of a jury on pure questions of fact (and I do not think it is) it would be almost an impossibility to attempt to review in detail all the evidence which I have listened to and weighed in a trial of such duration and complexity of fact, though not of issue.'

"All, therefore, that I propose to say in the present case is that the defendant company has failed to discharge the onus cast upon it to satisfy me, as a jury, regarding the identity and continuity of the vein in question. Though Mr. Bodwell presented his case to the best advantage, yet his able argument did not carry me beyond the doubtful stage, and consequently I think the only safe course to adopt is to confine the defendant to its own ground as against the plaintiff.

"The appeal should, in my opinion, be allowed."

JUDGMENT OF THE JUDGE APPEALED FROM

"This is an action for damages and an injunction against the taking of ore from the plaintiffs' mineral claims known as the *Red Hill* and *Black Hill* Fraction.

At the trial the learned trial judge, after examining the oral and written evidence, expressed the opinion that the workings and condition of the mines should be inspected, the learned trial judge, accompanied by two engineers, selected by the two parties hereto, visited the mine, ordered certain additional work done, and then had a second view. From the voluminous evidence adduced at the trial the learned trial judge found in favor of the defendant company, and the learned trial judge requested that further work be done on the ground that not enough had been done to establish his theory, and that without additional work as indicated by him, it was useless for him to proceed with his case. This was refused, and the learned judge then gave the judgment appealed from, which is a result mainly of his inspections. Upon appeal to this court, however, such leave was given the plaintiff to have certain further work done and to advance if necessary, such further evidence as the parties might be advised respecting the issues as developed at the trial. Pursuant to this leave, the work was done by Mr. W. E. Zwicky, and in due course, his evidence and that of the chief witnesses at the trial, as well as the evidence of Mr. Max Boehmer, an American expert, was given before us on this appeal.

"From a close reading of the proceedings on appeal, I cannot discover any tangible evidence. It is all highly theoretical, not to say rhetorical, and the arguments of counsel were equally vituperative.

"With regard to the position in which the plaintiff's counsel considered he stood at the close of the trial, it seems to me necessary for him to adduce evidence of a nature much stronger than before to establish his theory. If this new evidence does not add to it, but simply reaffirms the previous evidence it is not enough.

"Otherwise, giving the fullest effect to both sides, apart from the question of onus, which I submit now is on the plaintiff, the net result would be as before, one theory opposed to the other. But with this difference, that the defendant is supported by the opinion of the learned trial judge, based mainly upon his inspection and so should prevail with us.

"I joined in the order for the performance of the new work solely in the belief created by the strenuous argument of counsel that the new work would clearly demonstrate the contention of the plaintiff, and had I anticipated that the result would be to afford a breathing spell for a resumption of the wonderful display of theories as to the formation of the earth's interior by clever experts, I should have hesitated before concurring.

"The learned judge, however, was not impressed by the amount of ability who advanced diametrically opposite scientific theories. They assumed that position before the trial judge and maintained it steadfastly in giving their evidence on appeal.

"The trial judge, however, not only heard their theories, but, as it were, saw those theories worked out in the mine, and he was not impressed by

certain piece of work is not in so favourable a position to determine the nature of the work performed as if he saw him do it or saw the work after it was done.

"For my part, I find it as difficult to appreciate the value of the voluminous evidence in this case, as it is to understand the extent, trend and course of the different subterranean formations by handling the small fragments of 'rock' produced as exhibits, and about which there is such a hopeless divergence of scientific opinion.

"The proof must be clear and unmistakable. And in respect to this new work ordered by us to be done, I do not think it is either. The evidence is so perplexing that taking it alone one must arrive at the conclusion urged upon us by the plaintiff by a process of guess work and surmise. Indeed, so inconclusive is this new evidence that a view by this court is as necessary as it was by the trial judge.

"This may not be an inopportune time to emphasize the necessity for a change in the law whereby a view by the judge and two assessors shall be conclusive as to questions of fact, leaving an appeal only on questions of law.

"I would dismiss the appeal."

DEFENDANT COMPANY WILL APPEAL TO "THE COURT OF LAST RESORT."

A press despatch from Spokane, Washington, in which city Mr. Byron N. White resides, says: "With regard to the recent decision in the Star-White case, Byron N. White says he will contest the claims of the plaintiff to the court of last resort. He thinks there is little doubt that the Privy Council will be asked to sit finally on the case. His company believes that a more dispassionate consideration of the case can be had in England than in Canada. He adds: 'We have not been making this fight for six years for the fun of it, and we will not continue spending money just to keep the case in court. We believe we are in the right, and that in the end the highest court of jurisdiction in Great Britain will not fail to deal out to us the justice which we have so long sought. To that end we believe that the first favourable decision of Chief Justice Hunter and the recent dissenting decision of Judge Morrison will not be without influence.'"

In view of recent reports concerning the proposed establishment of iron and steel works in British Columbia, the following excerpt from a recent report of the Canadian commercial agent at Sydney, New South Wales, Australia, may be of interest: The first blast furnace operated in Australia upon commercial lines was opened on May 13. Iron has been produced for a week or two, and it is claimed that its quality is excellent. Bar iron has been made from the product in puddling furnaces and steel in open-hearth furnaces, and both are pronounced to be of a high grade. So far as can be seen, there is no reason why Australia should not produce its own pig-iron and steel.

MINING IN BRITISH COLUMBIA.

A Review by Former Editor of MINING RECORD.

ON MINING in British Columbia, Mr. H. Mortimer Lamb (formerly editor of the *MINING RECORD* and now secretary of the Canadian Mining Institute, with headquarters in Montreal, Quebec,), lately wrote for *Mines and Minerals*, of Scranton, Pennsylvania, U.S.A., the following interesting article:

Your correspondent recently returned from a visit, covering a period of some weeks, to British Columbia, after an absence therefrom of three years or thereabouts. The question was frequently put to him by old friends, "Well, do you find much change; how do you think we've gone ahead?" To which he would reply, "Yes, I find change and you have gone ahead." But the change that has taken place in British Columbia in the last year or so is a remarkable one, for it is a change of heart, of sentiment, and almost of character. The sort of change, in fact, that bridges manhood from youth in individuals and is bred of responsibility and a sense of fitness. The Province is not the British Columbia of ten years ago, exuberant, enthusiastic, bubbling over with froth and fume; nor is it the same country of five, or even three years ago, in the throes of reaction, depressed, disappointed, lacking in confidence, almost in courage. There has been a reawakening, a stimulation to life and energy and a realization of heritage. In short the country is on a different footing altogether than before; it has come to see that it has a splendid stock in trade in great natural advantages, but that to turn these to full account business methods must be employed and followed. It is largely as a result of this that conditions have so entirely changed; that the position of the mining industry in particular has so greatly improved, and that capital is again finding encouragement to invest in western undertakings.

Thus, in almost every district, the Slocan alone perhaps excepted, signs of material activity and progress are everywhere apparent; and but for the one disturbing factor, the high price and shortage of labour, the industrial outlook of the Province would be extraordinarily bright. Under the circumstances it is nothing short of marvellous that progress has been made at all, and that such is the case strikingly attests to the natural wealth and rich resources of which the Province is possessed.

I am informed, meanwhile, that at many of the mines, the labour item represents quite 80 per cent. of the cost charges—surely an unduly high percentage. This high cost of labour falls, of course, more heavily on the smaller properties, not at present profitably productive, than it does in the case of the larger mines, equipped with the very latest labour-saving machinery and handling large tonnages; but even these latter, which are chiefly to be found in the copper-mining sections, cannot stand the strain now

that the price of metal has undergone a considerable decline.

Mining in the Coast districts is steadily expanding and growing in importance, and quite recently some valuable finds of copper in large deposits and averaging from two to six per cent., have been found both along the mainland coast and on the several groups of islands adjacent thereto, notably a deposit on Moresby Island and others near Observatory Inlet. In some cases shipments of ore have already been made to local smelters, while in others development work is in progress. There is also considerably more activity on the west coast of Vancouver Island, one property in particular at Sidney Inlet showing up remarkably well, while the erection of another smelter at the head of Alberni Canal is under contemplation. Again, copper properties on the Queen Charlotte Islands are beginning to attract a deal of attention, several claims having been recently bonded at high figures there.

The potentialities of the country through which the line of the Grand Trunk Pacific is projected are very enthusiastically regarded by men who have prospected in some of these northern districts, notably those of the Skeena and Telkwa. Coal is distributed in widely separated localities in the Skeena watershed, and is reported to have been found on the lower reaches of the Telkwa River and its tributaries; the headwaters of the Morice River; the Bulkley River; Driftwood Creek; the Kitequeela River; the Kispiox and Tzesatzakwa Rivers; the head of Copper River and near the head of the Skeena itself. Unfortunately, however, none of these coals appear to be coking, which in view of the occurrence in the neighbourhood of large bodies of refractory ores is a matter of some concern, although systematic prospecting in the future may have a more successful issue. Minerals of economic importance have been discovered in various sections. These include deposits of galena and copper pyrites at the head of Kitimat Arm; iron near Port Essington, and copper ores in the Bulkley Valley series. Many of these deposits are of great extent, and while in most cases little more than surface prospecting has been attempted, promise exceedingly well.

Conditions in the Cariboo district are also satisfactory, despite the fact that operations were prematurely discontinued this season at Bullion, where is situated the largest productive hydraulic mine in British Columbia. Good clean-ups have, however, been made from claims on Mosquito Creek, from the Forest Rose, the Lowhee, and Stout's Gulch. At the last named some 300,000 cu. yd. of gravel were piped off during the season. The Slough Creek Company, engaged in mining the deep ancient river channels at Slough Creek, is now proposing to abandon steam power for pumping, and install electric pumps with a capacity of 5,000 gal. per min. The richness of the deep channels has been fully demonstrated, but heretofore the tremendous inflow of

water has proved an insuperable difficulty to overcome.

That of all the mining districts in the West, the Boundary is undoubtedly the most interesting and important. The progress made here has been few years ago practically nil, and the mining interest is due to a combination of factors, the first and foremost of natural circumstances, whereby it has been found possible to mine and smelt the ore at a cost so low as to challenge comparison in this respect with any copper mining district in the world. I was informed, by the way, that this summer Granby was even treating 0.8 copper at a profit, although I am inclined to think this an overstatement—but it is also due in no small degree to the ability of the individual mining engineers and metallurgists, who have charge of the big properties of the district, and who have been responsible for working out and solving the complex problems in connection with making ore averaging certainly not over 1.5 per cent. copper and \$2 to \$3 in gold and silver, pay to mine. How well they have succeeded may be ascertained by a glance at the recently published balance sheets of the principal companies operating in this field. The factors contributory to the low costs of mining and smelting in the Boundary are fairly well known. They are first, the great size of ore bodies, in consequence of which operations may be conducted on a large scale, while the conditions are such that little timbering is required; secondly, cheap power; thirdly, the utilization of machinery and the employment of methods designed to cut down the expensive item of labour to a minimum; fourthly, the practically self-fluxing character of the ore itself, and lastly, the abundance of cheap fuel available for smelting purposes. It is safe to say that if almost any of these factors were withdrawn, mining in the district could not be continued. Operations at present are to all intents and purposes confined to the working of a half dozen big, low-grade properties. The methods of mining employed at these mines are largely identical, and include open pits and rock pillars and stopes. The workings in pit No. 1, the Granby, now resemble more than anything else the cloisters or aisles of some mighty abbey or cathedral.

In a recent paper, Mr. Frederic Keffer, of the British Columbia Copper Co., describes at length, and most comprehensively, the methods of mining employed at the Granby and other Boundary mines, from which I abstract the following information: In opening up the deposit for glory hole work, a tunnel or drift is run under the ore at a depth, if possible, below the point where the perpendicular wall and foot-wall will come together. Raises are now run near the foot-wall from this drift, or from its branches to the surface, which raises are provided with ladders, etc. Having thus reached the ore, the miners then begin to blast away their collars, funnel-shaped openings being formed which grow deeper and wider as the work progresses. The drill holes are run from 6 to 20 ft. deep. By

keeping the sides of the tunnels sloping about 45 deg. the ore may be carried into the raises with little or no shovelling; but occasionally instead of funnelling the ore into the raises it is loaded in cars and dumped. At one time the Granby Company used steam shovels for loading ore in one of the glory holes, but at the time of my visit I was informed that this method had been abandoned. In the case of deposits of low dip, the plan usually employed is to open stopes above a roof supported by pillars of ore, and when the dip exceeds 60 deg. it is the practice to run several approximately parallel drifts under the ore. From these drifts raises are made at intervals of from 25 to 35 ft., each being provided with timbered chutes lined with $\frac{1}{4}$ -in. steel plate. About 10 ft. over the backs of the drifts, stoping is commenced and ultimately all the ore is broken down between the intervening spaces until one large stope remains. The stope is carried the entire width of the ore, pillars being left at intervals to insure the safety of the roof, stoping being then carried on up to the next level, and so on. In the Granby mines it is usual to run three or more drifts under the ore, and as the stope grows higher a drift in the barren foot-wall is driven and raises made to reach the ore which will not fall on the footwall, the whole object being to avoid shovelling.

The report of the Granby Consolidated Mining, Smelting and Power Company, Limited, for the year ending June 30, 1907, recently issued, is on the whole satisfactory. This is due, however, rather to the high price of copper than to industrial expansion since mining and smelting operations show a falling off, in consequence, it is alleged, of fuel shortage. Thus the eight large furnaces could only be operated intermittently, and during the month of May both mines and smelter were closed down for a period on this account. At the beginning of the year it had been estimated that in consequence of the increase in furnace capacity, it would be possible to make a production of 25,000,000 lb. of copper; but the actual production only reached 16,403,749 lb. According to the president's statement the cost per pound of copper produced, after deducting the value of the gold and silver, was .1014 during the past year, as compared with .0835 in 1905-06, and while this increase is attributed to the causes already mentioned, the increase of wages may also very probably be responsible. The report states that the smelter is now equipped to treat over 1,000,000 tons of ore per annum, which should produce in the neighbourhood of 30,000,000 lb. of copper.

Of the more important new work undertaken and completed, mention is made of the new three-compartment shaft, by which connection will be obtained with the different levels; and the installation of a complete electric haulage system on the 400-ft. level. The ore reserves have also been considerably increased during the year.

Last year's operations are briefly summarized in the following returns and figures: Copper produced,

16,410,576 lb.; silver, oz., 257,378; gold, oz., 35,083; Granby ore smelted, 649,022 tons; foreign ore smelted, 16,893 tons; mine development, 9,701 lin. ft.; diamond drilling, 7,279 lin. ft.; total amount realized, \$4,521,549; charges of all kinds, \$2,672,529; net profit, \$1,924,937; dividends, \$1,620,000; surplus, \$2,775,757; new construction, \$317,677; new mining properties purchased, \$68,164; cash and copper on hand, \$853,280.

Production from the Boundary is at present being maintained at the rate of about 35,000 tons a week, and if this is kept up the output for the year, notwithstanding the curtailment of shipments this last spring and summer in consequence of coke and car shortage, will rather exceed that of 1906. During the year the machinery equipment both of mines and smelters in the district has been considerably augmented, and other improvements and additions are now either in progress or contemplated. Mention in this regard may be made of the new shaft house at the head of a three-compartment incline shaft, now in use, and connecting with the lower levels, whence the ore is hoisted to bins and passing through powerful jaw crushers is carried over a conveying belt to the railway bins. In the head-frame is placed a rotating bin near the top of the frame into which the ore or waste falls from the skips, and which by rotation delivers the contents of the skips into any one of the three chutes as may be desired, two of the chutes communicating with the bins above the crusher, the third being for waste. At the company's smelter, the furnaces, eight in all, are being enlarged by an additional 4 ft. in length with a view to increasing the tonnage capacity of the works from 3,200 to 4,500 tons daily; new coke bins are being built; the converter plant is being doubled, three more stands being added while an addition of 80 ft. is being made to the steel building; and other improvements include the construction of a new flue chamber and the installation of another blowing engine and two blowers. At the Snowshoe, under lease to the Consolidated Mining and Smelting Company of Canada, a 30-drill Rand compressor is being installed, while the Dominion Copper Company is reconstructing its smelter plant at Boundary Falls, and is substituting for the two small and out-of-date furnaces one large 750-ton furnace of similar design to that already installed. The British Columbia Copper Company's smelter at Greenwood has also been completely remodelled within the past year, and is now regarded by men competent to form an opinion as one of the best designed plants of the kind in the world.

One's first impressions of Rossland are disappointing. On the streets of the little town all the bustle and go which was one of the characteristics of the boom times has disappeared and instead there is an air of peace and calm, which to one accustomed to the old state of affairs is somewhat disconcerting. As a matter of fact, however, Rossland was never in a better condition from a business standpoint. It

is true all speculation has ceased, but what mining is being done is on a strictly business basis, and in several important directions have been reduced, and generally speaking, work at the mines is being ably and well directed. Possibly the best thing that ever happened in Rossland's interests was the consolidation effected a year or so ago, by which the War Eagle and Centre Star were acquired by the Consolidated Mining and Smelting Company of Canada, which also owns the Trail smelter, the St. Eugene silver-lead mine at Moyie, and other properties. As a result of this consolidation, these two mines have not only been placed on a regularly profitable footing, but the mistakes and vicissitudes of the past are being forgotten in the successes of the present and in the bright promise of the future. At the Le Roi the outlook is not quite so favourable. The mine itself, may still be considered the premier property of the district, but the company is working at a great disadvantage in that it continues to ship ore to its smelter at Northport, Washington. This smelter is badly situated in that it is difficult to secure a supply of custom ores at that point, and consequently, in order to keep the furnaces running the Le Roi ships a great quantity of nearly valueless rock, which considerably reduces the average of the grade of the output of the mine and heavily handicaps its earning possibilities. In contrast to this policy, the Le Roi No. 2 has for some years past shipped only ore of high grade to the smelters and has steadily declared substantial profits. The Le Roi No. 2 in fact is one of the best managed mines in the West—the one notable exception in the long list of mismanaged British-owned properties.

On account of the shortage of coke, operations at the Trail smelter have been considerably restricted this summer; but it now seems that this difficulty is at an end and henceforward the furnaces will be operated at full capacity. Meanwhile a number of important additions to the plant have either been recently made or are in progress, including provision for an increased copper furnace capacity; the doubling of the capacity of the Huntington-Heberlein plant; the construction of a new sampling mill; the increase of the capacity of the electrolytic lead-refining plant to 75 tons daily, and the installation of plant for the manufacture of hydrofluosilicic acid used in the lead works. In connection with these works it may be noted that some slight modifications in the practice have been introduced, the washed slimes being now treated with sodium sulphide and then deposited out of the solution electrolytically.

I attempted to ascertain from various sources and authorities the reason of the "slackness" in the Slocan silver-lead districts, which is all the more unaccountable in view of the relatively high prices of these metals prevailing for some time past. Every view or expression of opinion was at variance. One or two attributed the absence of considerable activity to the fact that the district never recovered from the effect of the eight-hour law; others to the present

high price for labour; the failure of one or two of the better known mines, like the Payne, which had resulted in a general withdrawal of confidence; and finally, and this is probably nearer the mark, that never in the history of the Slocan had there been, except in one or two isolated instances, any really systematic development work carried out to provide for reserves, or in other words the district is now suffering from the effects of former unworkmanlike mining and prodigality. Again, there may be something in the contention that freight and treatment charges in the past have been somewhat excessive. But whatever the cause, the Slocan as compared with other mining sections in the West is decidedly dull, although happily signs of a revival of interest are not entirely wanting.

Around Nelson the outlook is by no means discouraging, there being more activity than for some years past, despite the closing down of the Hall Mines' smelter, which as a matter of fact has never, in part due to faulty design and arrangement, been operated with any great measure of success. In East Kootenay, both the St. Eugene and Sullivan mines are showing excellent results. A considerable proportion of the ore from the former property is being consigned at present to Europe, while the Sullivan's ore is treated locally at the smelter at Marysville.

At the Crow's Nest collieries operations are being steadily extended but the difficulty of securing labour both for the mines and coke ovens, has been very serious, and this and also the inability of the railway companies to meet car requirements, has been responsible for the coke shortage of which so much complaint was made this summer. Meanwhile the situation in these respects has recently improved, and as the Pacific Coal Company (a Canadian Pacific Railway Company organization), is opening new coal mines at Hosmer, it is hoped that henceforward metallurgical operations in the Kootenays will not be hampered as they have lately been on account of an inadequate fuel supply.

The following particulars as to the present demand for talc, and its marketable value, have been published in the *Engineering and Mining Journal* of New York: France is becoming an important centre for the output of talc, in block or in powder. Good white talc may be purchased at from 80 to \$11 per metric ton (2,204 lb.), and a better quality is obtainable at 85 per ton, only in France. It is used largely for burners of acetylene-gas jets, and a contract with an American firm has lately been closed for 500,000 lb. of talc at \$10 per ton for the same similar purposes. France may now be considered the first European country for the output of talc, having overtaken Italy, which was long the largest producer. It was finally adopted.

The price of lead has fallen to about that at which the London Government had been in practice

YUKON TERRITORY.

Official Reports to March 31, 1907.

YUKON TERRITORY AFFAIRS are dealt with in several official reports for the nine months ended March 31, 1907, which have been published in the "Annual Report of the Department of the Interior," recently sent out from Ottawa. In reprinting these herein some detailed tables of statistics have been omitted, also such parts of the several reports as have not been considered of public interest.

REPORT OF THE ACTING COMMISSIONER.

"The production of gold in Yukon Territory, as taken from the official returns, for the nine months ending March 31, 1907, was 220,319.40 oz.; at \$15 per oz., which is the valuation fixed for royalty purposes, the value would be \$3,304,791.05. This, however, is below the actual value, but must be used for purposes of comparison. For the last nine months the gold production has been less in proportion than during any similar period since 1898. This is due to the fact that nearly all the claims on Bonanza, Eldorado and Hunker Creeks have been worked to such an extent by comparatively primitive methods, that it is no longer profitable to continue working them except by the introduction of a water system and the installation of dredges. A vast number of the claims on these creeks, and on the hillsides adjoining, have been acquired by purchase by the Yukon Consolidated Gold Fields Company.

"Dredging.—The above-mentioned company have installed three large dredges on lower Bonanza, and will have them in operation during the summer season of 1907. They are also constructing enormous ditches and flumes for the purpose of bringing about 5,000 miner's inches of water from Twelvemile River, a tributary of the Yukon, to the gold fields of Bonanza and Hunker. The proposed work will necessitate the construction of ditches and flumes some 50 miles in length. They have also installed on Little Twelvemile River, a power plant, to be operated by gravity water, which will provide by electricity the power to operate the dredges on Bonanza. This will enable the company to operate large tracts of ground which are not sufficiently high grade to be worked profitably by individual miners. The company are also constructing a large dam at No. 57 above Discovery on Bonanza Creek, which, when completed, will store 350,000,000 gal. of water. The difficulty in the past has been that the snow has melted on the hills during the latter part of April and early in May, and there was a surplus of water for a few weeks, but by June 1, generally, there was not sufficient for hydraulic work on the hills. The construction of this dam will conserve the water for a long period, and enable work to be carried on during the dry season, usually June, July and August. The magnitude of the work of this company can

hardly be overestimated, and when they shall have their ditch constructed and in full operation, the gold produced will be enormously increased, although I do not look forward to this result before the season of 1909.

"The operations of the Canadian Klondyke Mining Company on Bear Creek, where a large dredge has been at work for the last two seasons, have demonstrated that mining by this method can be successfully carried on.

"Bonanza Basin Gold Dredging Company operated a dredge at the mouth of Klondyke River, with such satisfactory results that they intend, I understand, installing another one early this season.

"The Lewes River Dredging Company, which have operated on Bonanza for the past five years, were very successful and will continue to work.

"The Ogilvie dredge was engaged during the summer months at work on the submerged bed of Klondyke River near its mouth. Arrangements have been made to transport this dredge to some claims on Indian River, where it will work during the summer of 1907.

"The Fortymile Dredging Company, which installed a dredge on that river late in the season, will begin work as soon as the ice has gone.

"The practicability of dredging for gold will be thoroughly demonstrated during the season of 1907, and if successful, in view of the conditions of the frozen ground, then we may expect a tremendous development along these lines.

"Individual Mining.—Much individual mining has been carried on at Granville, Quartz, portions of Dominion and Hunker, during the present winter with, it is believed, considerable success. It was felt that every effort should be made to assist and encourage the opening up of new creeks for the individual miner, and the local government expended a considerable sum in the purchase of two Cameron pumps and a boiler to enable the miners of Duncan Creek, in the Stewart River district, to sink to bed-rock and cross-cut the creek. It had been found that the water could not be successfully handled except by powerful pumps. The work this season was not altogether satisfactory, and it will require another winter's work to demonstrate the possibilities of this creek. The claim owners who were engaged in doing the representation work on one claim, are disappointed but by no means discouraged, and it is thought that next winter will thoroughly decide the value of this creek.

"Considerable work was done in placer mining in the Salmon River district, notably on Livingstone Creek, during the last season, and prospecting and mining on a smaller scale in the Klunene district. There has been great activity in the southern end of the Territory in quartz and copper. Many properties have been bonded, and it is confidently expected that considerable capital will be introduced and the enormous resources of this portion of the Territory thoroughly developed.

"Yukon Placer Mining Act." The Yukon Placer Mining Act has been in operation a sufficient length of time to enable us to appreciate the value of the present code. There may be occasion for some amendments and modifications, and at the next session of the Yukon council the matter will be thoroughly gone into, and recommendations made that will tend to remove any cause for friction, and will make the act as workable as possible, both in the interests of the individual miner and of the large companies now investing so heavily in the Territory.

"Yukon Council.—The Yukon council met on July 5, 1906, and prorogued on July 18. Fourteen ordinances were passed in connection with the local administration, and other necessary business transacted. The revenue of the Territory for the nine months ending March 31, was \$336,279.22, and the expenditure \$309,234.79.

"Schools.—The school system has been maintained in the same high state of efficiency as in the past, and has always given the greatest satisfaction to the people of the Territory.

"Administration of Justice.—Good order and the absence of crime have marked the nine months just closed, due to the splendid service of the Royal Northwest Mounted Police and the prompt and efficient administration of justice.

"General.—There is a feeling of optimism throughout the Territory, based on the splendid outlook for the future, which I feel cannot fail to be fully realized.

"J. T. Lithgow, Acting Commissioner."

REPORT OF THE GOLD COMMISSIONER.

"During the nine months ending March 31, 1907, 47 protests have been issued by the clerk of the gold commissioner's court. This is a slight proportionate increase over the previous twelve months, in which 53 protests were issued. The increase is due in the first place to the large number of locations recently made in outlying creeks with a view to joining groups of claims together for dredging purposes, the general opinion prevailing that the creeks formerly staked and found not of sufficient value to work under the ordinary placer mining methods, will carry sufficient gold to work profitably if worked by a dredge. Secondly, owing to the changes in the Placer Mining Code from the mining regulations in force prior to August 1, last, a number of new questions have arisen for consideration that are not settled by the cases heard under the old regulations.

"Only one case has been heard since August 1, last, under Section 60 of the Placer Mining Code, and the result has been unsatisfactory. In the first place, no provision has been made in the act for any procedure for hearing a dispute under this section; secondly, there is no provision for enforcing a judgment given by the arbitrators; and thirdly, the arbitrators being inexperienced in hearing disputes, do not take proper notes of the evidence, and the result is that the record is in such shape that it is impossible

for either party to appeal if they desire to do so. In the case heard the arbitrators were appointed and the parties appeared before them, but they did not take proper notes of the evidence, and after they gave their decision it was found there was no means of enforcing the judgment, and the whole matter remained a nullity, as the parties who thought they were not properly treated would not adhere to the arbitrators' decision, and as far as I can learn, nothing further has been done in the matter. Considerable complaint was made at the same time over the costs of the arbitrators.

"To my mind, the settling of disputes under this section is costly, cumbersome and unsatisfactory.

"E. A. Senkler, Gold Commissioner."

REPORT OF THE ASSISTANT GOLD COMMISSIONER.

"Herewith I submit the financial report of the gold commissioner's office, at Dawson, for the period extending from July 1, last, to March 31, last, which embodies the revenues collected at this office from mining dues during the said period, and also the revenues received from the offices of the mining recorders for the Duncan and Sixtymile mining districts of Yukon Territory. The statement shows that the total receipts of mining dues amount to \$105,048.30, which is considerably in excess of the receipts for the corresponding period of the fiscal year ending June 30, 1906.

"The 'Yukon Placer Mining Act' of 1906, which came in force on August 1, 1906, has brought about an increase of work in connection with the provisions regarding the enlargement of the size of claims; also regarding the grouping of claims. On the other hand, the coming into force of the said act has done away with the necessity of certificates of work and free miner's certificates.

"The returns of the mining recorder for the Duncan mining district have kept up about the same as during the previous year, and those of the mining recorder for the Sixtymile mining district have been about the same as they were prior to the abolition of the said office on January 31, 1905, for the corresponding months.

"The returns of the offices of the assistant gold commissioner at Whitehorse, and of the mining recorders for the Klunne mining district and the Conrad mining district have been forwarded to the Department of the Interior direct from Whitehorse during the period herein above-mentioned, and therefore, there is no occasion for me to make any other reference than this to them.

"During the said period of nine months ending March 31, last, the following hydraulic mining leases were cancelled by the Department of Interior, viz.:

"1. Lease No. 38, issued on March 17, 1903, in favour of Andrew W. McConnell, covering a location on the Klunne River, in the Dawson mining district, two miles in length by one mile in width; cancelled on October 15, last.

"2. Lease No. 43, issued on November 5, 1902, in favour of the Klondike Consolidated Gold Fields, Limited, of London, England, covering a location situated on the right limit of Stewart River, and having a length of about five miles, more or less, commencing at a point about five and three-quarter miles below McQuestion River, and extending thence down stream the above-mentioned length; cancelled on March 1, last.

"No hydraulic mining leases were issued by the Department of the Interior during the said period.

"F. X. Gosselin, Assistant Gold Commissioner."

Financial Statement from July 1, 1906, to March 31, 1907.

Receipts.

	Amounts.	Totals.
Dawson—Free Miner's Certificates...		\$ 10,402.75
Dawson—Placer.		
To Grants	\$ 18,270.00	
Renewals	38,645.00	
Relocations	9,160.00	
Registered Documents	8,886.00	
Certificates of Partnership.....	254.00	
" Work	1,378.00	
Abstracts	74.75	
Amended Applications	30.00	
		\$ 76,697.75
Dawson—Quartz.		
To Records	\$ 1,125.00	
Certificates of Work	467.50	
" Partnership	35.00	
Registered Documents	387.50	
Lieu of Assessment	100.00	
Certificate of Improvements	60.00	
Crown Grants Acreage	1,254.32	
		\$ 3,429.32
Dawson—Sundry Accounts.		
To Water Grants	\$ 1,130.00	
Advance Deposit Account	1,907.98	
Hydraulics	1,764.50	
		\$ 4,802.48
Clear Creek.		
To Free Miner's Certificates	\$ 33.50	
Relocations	40.00	
Renewals	30.00	
Registered Documents—Placer..	17.00	
Certificates of Work	6.00	
" Partnership	4.00	
Water Grants	10.00	
		\$ 140.50
Duncan.		
To Free Miner's Certificates.....	\$ 476.25	
Placer Grants	230.00	
Renewals	4,270.00	
Relocations	720.00	
Certificates of Work—Placer....	126.00	
" Partnership	44.00	
Registered Documents	537.00	
		\$ 6,403.25
Sixtymile.		
To Free Miner's Certificates	\$ 86.75	
Placer Grants	1,130.00	
Relocations	280.00	
Renewals	1,170.00	
Certificate of Work—Placer....	46.00	
Registered Documents	451.50	
Certificates of Partnership		
—Placer	8.00	
		\$ 3,172.25
		\$105,048.30

Disbursements.

Dawson.	
By Receiver General	\$103,016.07
Gold Commissioner's Suspense	
Account	109.25
Balance Account	1,922.98
	\$105,048.30

The foregoing receipts show a net decrease of \$15,514.96 for the period of nine months as compared with the fiscal year immediately preceding, as under:

Comparative Statement of Receipts.

	Year ending June 30, 1906.	Nine months ending March 31, 1907.
Free Miner's Certificates	\$ 25,578.34	\$ 10,999.25
Placer Grants	7,515.00	19,630.00
Renewals	46,710.00	44,115.00
Relocations	8,940.00	10,200.00
Registered Documents—Placer	7,149.50	9,891.50
Certificates of Partnership.....	586.00	310.00
" Work	9,396.00	1,556.00
Abstracts	40.50	74.75
Amended Applications	5.00	30.00
Water Grants	905.00	1,140.00
Hydraulics	6,318.19	1,764.50
Quartz Records	2,265.00	1,125.00
" Registered Documents	815.75	387.50
" Certificates of Work	985.00	467.50
" " Partnership.....	128.00	35.00
" In Lieu of Assessment....	400.00	100.00
" Certificates of Improvement.	22.50	60.00
" Acreage	705.50	1,254.32
Advance Deposit	1,922.98	1,907.98
No. 1 Hester	175.00	.....
	\$120,563.26	\$105,048.30

REPORT OF THE COMPTROLLER.

"The expenditure under the vote 'Administration of the Yukon' through the Department of the Interior, disbursed through my office, was \$124,299; statements, with vouchers, being forwarded to the department at the end of each month.

"The local revenues and expenditures of the Yukon Territory for this period were: Revenue, \$336,279.22; expenditure, \$309,234.79, administered through my office; quarterly statements, with vouchers, being sent to the auditor general as required by order in council.

"It was not considered advisable to change the fiscal year in the management of the local affairs of the Yukon Territory, as it is much more convenient to hold meetings of the Yukon council during the month of July, or August at the latest, when the business of the previous fiscal year can be wound up and presented to the council; consequently there is a difference between the Dominion fiscal year ending March 31, and the local fiscal year ending June 30, as formerly, of three months.

"The disbursement on account of the Department of Justice was \$20,859.27, for services in connection with this Territory, monthly statements being forwarded, with vouchers.

"The expenditure on account of the Department of

Indian Affairs, for the relief of sick and destitute Indians, etc., was \$2,196.39, and for account, \$2,250.

"The management of the expenditure of the Department of Public Works 'buildings' has, as heretofore, been vested in the Superintendent of Public Works and myself; the expenditure was \$60,696.56.

"The royalty collected in the Territory for the nine months was \$82,622.12. Dawson, \$89,650.38, and Whitehorse, \$2,092.04. There was nothing collected at Fortymile.

"The receipts from free certificates issued to exporters of gold from Alaska were \$215.50.

"The revenue from these sources was forwarded to the credit of the receiver general, drafts being sent to the department weekly, and statements monthly.

"The revenue from the sale of the Yukon territorial court law stamps was \$3,065.10, from mining court stamps, \$342.75; drafts and statements being sent to the Department of Inland Revenue.

"Monthly statements of the revenue received in the offices of the gold commissioner and crown timber and land agent have been checked each month as formerly, and the returns forwarded to the Department of the Interior. The suspense account in the gold commissioner's office has been checked and the cheques countersigned in payment of withdrawals.

"The management of the affairs of the City of Dawson has been vested in my office.

"Since January 1, the services of the assistant tax collector have been dispensed with, the city office having been transferred to my office.

"G. I. MacLean, Acting Comptroller."

REPORT OF THE CROWN TIMBER AND LAND AGENT, DAWSON.

"During the nine months ending March 31, 1907, the revenue has increased, over the same period of last year, in the Timber Branch \$1,129.07; in the Lands Branch, \$232.49,—\$1,361.56.

"During the period \$1,881.03 was paid in on account of the purchase of Dominion lands, \$1,534.31 on account of coal lands and survey fees therefor, and \$105.15 on account of the purchase of town lots.

"There is not much demand for Dominion lands, and the availability of these will hereafter be taken advantage of only by those whose vocation makes their residence on the land a necessity, the cultivating of the land being a profitable side issue. The farms already in cultivation in the vicinity of Dawson are quite capable of supplying the present market for products of agriculture. Chicken raising as an industry has developed considerably of late years. Ranch eggs sell at \$3 a dozen in the winter and \$2 in the summer. The first crops of light vegetables, such as lettuce, radishes and onions, are raised in greenhouses, and are usually on the market by about Easter. A number of farms along Klondike River last season suffered as a result of the high water carrying and depositing a heavy sediment over acres which had been seeded, and again, later, it was found that worms and insects had invaded entire crops. In

view of these difficulties and the fact that sales of the Klondike will soon be closed for good, the Klondike is being abandoned by the farmer. The last growing season in the neighbourhood of Dawson are directly across the river, at St. Ignace and West Dawson, where the ground is high.

"As the fire season draws to a close, the fire largely in the revenue. There is a boom in coal lands and a large revenue will be derived from this source during the current year. Coal mines are now being worked on Coal Creek, below Fortymile, at Five Fingers, at Tantalus and at Tantalus Butte, at which latter place C. E. Miller, the discoverer, claims to have the best coal yet found in the Yukon Territory. Mr. Miller also discovered the Five Fingers mine and the Tantalus mine. All the steamers on the Dawson-Whitehorse run will consume coal this season, with the exception of the three new boats to be operated by the White Pass & Yukon route, which also will burn coal eventually. Thousands of tons of coal will be placed on the market this season.

"Homestead regulations were adopted by order in council dated July 23, 1906, which came into force on January 2, last, but owing to the fact that we have only now received advice to this latter effect, the several applications made to this office for permission to homestead were not dealt with.

"There are three saw-mills operating in Dawson district at the present time, all of which are located in Dawson and are run by steam-power. In addition to these there is a mill on Twelvemile River, operated by the Yukon Consolidated Gold Fields Company, at which they manufacture the lumber required by them for mining purposes. From this the department receives no revenue.

"The total sales of the three mills during the nine months are as follows: 1,624,689 ft. of lumber, 44,944 railway ties, 602¾ cords of wood. The average price now obtained for all kinds of lumber is \$40 per thousand feet B.M.

"The new system of issuing permits for the cutting of saw-logs seems to work satisfactorily. Woodmen are enabled to cut small patches of logs which they find near their wood camps, and thus timber is saved which would otherwise be left or cut up into cordwood. The timber berths now in existence are getting to be pretty well denuded of timber.

"Wood for use on steamboats cannot be got less than a dollar a cord, and the Yukon and the necessity of going further back is opportunely relieved by the advent of coal. Wood is getting to be more expensive than coal, and in the near future wood will likely be entirely displaced by coal for fuel purposes. I believe there will be sufficient coal mined this season to operate all the steamers, as well as supplying Dawson with fuel.

"A great portion of the Dawson waterfront was relinquished by the lessees last year, but owing to the large shipments of coal which are to be made to

Dawson this summer and in future, nearly all of that abandoned has been taken up for the purpose of erecting coal docks thereon. No less than 750 ft. of frontage has been applied for, for this purpose, whilst in Dawson and Klondike City 550 ft. had previously been taken up and put to the same use.

"As you are aware, this office was placed in my charge last August, thus leaving me in the dual capacity of assistant gold commissioner and crown timber and land agent. This was done by the commissioner, under instructions from the minister of the interior. Although there is a considerable amount of work in connection with the administration of this office, all the clerical work, accounting and correspondence has been attended to by one clerk, W. F. Povah, since last August, and the inspection work has been done by one inspector. The staff has been steadily decreased from a total of seven to one clerk in the office, and one timber inspector, under my supervision, creating a saving to the department of more than \$1,000 per month.

"F. X. Gosselin, Crown Timber and Land Agent."

Receipts of Crown Timber Branch.

Royalty	\$ 7,250.64
Timber permits	7,549.82
Seizures	494.75
Hay permits	105.
Coal royalty	517.34

Total

Receipts of Dominion Lands Branch.

General sales	\$ 3,420.49
Rentals	1,943.92
Registration fees	40.50
Survey fees	100.00

Total

REPORT OF THE DIRECTOR OF SURVEYS.

Mr. Genest (draughtsman) was employed in this office until August 31, since that time Mr. Gibbon, D.L.S., and myself have been the only members of the staff.

"In August and September surveys of base lines, under the code, of the following creeks were made by Mr. Gibbon: Guysboro off Klondike, Belcher off Klondike, Rabbit off Klondike, 20 Pup off Hunker, 21 Pup off Hunker, Hattie Gulch off Hunker, 37 Pup off Hunker.

"These base line surveys include surveys of the end boundaries of the claims located on the creeks, and the system has proven very satisfactory. While these surveys are somewhat more expensive, much more information as to location of claims is obtained, and double staking of the same ground is largely prevented.

"On account of the office staff being so reduced Mr. Gibbon has considerable fieldwork for which returns have not been made, namely, the following surveys:—

"Clear Creek base line (spring, 1905). Photo-

topographical survey, Klondike watershed (1905). Barker Creek base line (spring, 1906). Traverse 40 miles Stewart river (1906).

"C. W. McPherson, Director of Surveys, Y.T."

REPORT OF THE ASSISTANT GOLD COMMISSIONER, WHITEHORSE.

"Only since July 1, last, has the Whitehorse division of the Whitehorse district made any real advance towards becoming a mining camp.

"During the past summer Mr. Byron N. White, of Spokane, started work on the Pueblo and Carlisle claims and met with such success that the Grafters, Arctic Chief and Valerie claims have changed hands and are now being worked with most encouraging results. In addition to the above Col. W. S. Thomas has, on behalf of eastern capitalists, purchased about 400 claims, including some of the best properties on the range. Col. Thomas is now arranging to spend a considerable amount in development.

"The prospects for this division are brighter than ever before, and it is now practically assured that, within a very few years, this division will be an important factor in the production of copper.

"The Big Salmon division of the Whitehorse district has produced about \$70,000 in gold during the past season, and promises to equal this for a few years to come at least. In this division Summit, Cottoneva and Livingstone Creeks are all producing.

"The Nisutlin division has not, up to the present, developed anything of value. Not more than ten men spent last winter in this division.

"The Klwane district has produced about \$20,000 in gold, but nothing new has been developed in placer. Several most promising copper areas have been discovered and there is little doubt that a railway through that district would develop many valuable copper mines.

"In the Conrad district about \$225,000 was spent in the development of silver-gold properties, with good results.

"Valuable ore in considerable quantities has been struck on the Montana, Vault, Venus and Big Thing claims, also on the T. M. Daulton properties.

"Between 500 and 600 claims were recorded in the Watson division, and about \$20,000 spent in development. Ten tons of ore from the Tally Ho group netted \$46 per ton over freight and smelting charges.

"L. T. Burwash,

"Acting Assistant Gold Commissioner."

Summary of Fees Collected.

At Whitehorse office	\$ 14,144.89
" Conrad "	2,461.75
" Klwane "	2,665.00

Total

REPORT ON AGRICULTURAL PRODUCTIONS.

"This Territory has made wonderful strides in the past few years in agricultural productions. It was

considered in 1898 that it would be reasonable to raise vegetables here, owing to the shortness of the summer, but the experiments of the last two years have shown us that we can produce nearly all the vegetables that are grown in other parts of the Dominion. The farming so far is principally confined to the river bottoms, where the soil is richer than on the hillsides. Native hay is largely grown, and the production the past season was about 200 tons, marketed in Dawson, which sold at \$60 a ton. There was also about 100 tons of native oats raised. This is cut green and used as fodder, and realized about \$75 per ton.

"The production of vegetables for the past year, taken from the figures furnished by the board of trade, is estimated as follows:—Lettuce and radishes of a superior quality sufficient to amply supply the wants of the Territory; cabbage and cauliflower, 40 tons; turnips, 40 tons; carrots, 20 tons; beets, 15 tons; potatoes, 75 tons; celery, 1,200 dozen.

"The home production of turnips, carrots, beets and celery is sufficient to supply all the local demands, and importations have ceased. The vegetables raised in the Klondike cannot be excelled, if equalled, anywhere else in the world in size and quantity. The forced growth through the summer under the never-setting mid-night sun allows no time for shrinkage or toughening in any way. All vegetables are free from pith, and are unmolested by any form of insect life or any other annoyance known to farmers in many other parts of the world. Many of the Dawson gardeners have stocked their cellars heavily, and will have turnips, potatoes, beets and celery for sale most of the winter. Some have extended green-houses in which many vegetables are grown through the winter and early spring. Potatoes are grown most successfully in all parts of the Territory. They bring from 5 to 8 cents per pound on the Dawson market. Experiments are being made gradually with hardy grains, and doubtless the Yukon in time will grow far more of the supplies that it annually consumes than it has yet ventured to produce.

"J. T. Lithgow, Acting Commissioner."

At a meeting of shareholders of a mining company, held in England, Oliver Wethered, known in British Columbia as one of the directors of the Ymir Mines, Limited, stated that he was the deputy-chairman of the Dolcoath mine, Cornwall, in which, about a year ago, they had awakened to the fact that they had a vast amount of ore containing zinc, copper, arsenic, and tin. In their mine numerous tests had been made with the Elmore process. As a matter of fact, with that process they recovered 90.6 per cent. of copper and got 93.2 per cent. of zinc, while in tailings they got their tin oxide, which they treated in the ordinary way. The Elmore process had been tested in other mines with excellent results.

A post office, to be known as Riodel, is to be opened at the Blue Bell mine, Kootenay Lake.

CANADIAN MINING INSTITUTE.

A WESTERN BRANCH of the Canadian Mining Institute would, in the opinion of a number of members of said association, be of great value in the mining districts of the West, and would thereby tend to increase the utility of the Institute in the Western provinces, in which the utility of local branches is also recognized.

Frederic Keffler, of Greenwood, Boundary district, engineer in charge of the several mines of the British Columbia Copper Company, Limited, in a capacity as president of the Institute has sent the following circular letter to the Western members:

"It being difficult for members residing in the western provinces and adjacent United States territory to attend the meetings of the Canadian Mining Institute, which are usually held in Eastern Canada, the council suggests that a branch of the Institute be formed to include this district with a view to holding regular meetings in the West, and thus more largely participating in the general work of the Institute.

"You are, therefore, requested to attend a meeting of the Western members, to be held in the city of Nelson on January 15, 1908, at 2 o'clock p.m., when steps will be taken to organize the said branch. A number of papers prepared for the regular annual meeting of the Institute will also be presented for reading and discussion at the Nelson meeting.

"I enclose herewith a list of names submitted to the council to constitute the officers of the Western branch for the year. Members are requested to make a cross opposite names of persons whom they desire to be elected; or to substitute in the blank space provided on the ballot slip the names of the persons other than those suggested. Western members now serving on the council of the Canadian Mining Institute will be *ex-officio* members of the Western branch.

"You are urgently requested to be present at this Nelson meeting, and, if possible, to read a paper as well. Members presenting papers at this meeting should send the MSS. to H. W. Hume, Land Secretary, 413 Dorchester street W., Montreal, at the earliest date to admit of printing.

"The names submitted by the council as nominees for the Western branch, respectively, are as follows:

"For president—A. B. W. Hodges, Grand Forks, B.C.

"For secretary—E. Jacobs, Victoria, B.C.; J. W. Collis, and E. Cave Browne-Cave, both of Vancouver, B.C.

"For council—Paul S. Goudrey and R. Stuart, Rossland, B.C.; J. J. Campbell and Leslie Hill, Nelson, B.C.; E. C. Musgrave, Vancouver; W. M. Brewer, Victoria, B.C.; O. E. S. Whiteside, Blairmore, Alberta; H. H. Hume, Secretary, Winnipeg, U.S.A."

THE CANADIAN CAMP.

DR. ROBERT BELL, chief geologist of the Geological Survey of Canada, was the guest of honour at the semi-annual banquet of the Canadian Camp, held at the Hotel Astor, New York, U.S.A., on November 18. The "camp" is a kind of social club which is rapidly growing in importance, and has already more than 1,000 members. The only qualification for membership is that the applicant must have camped in Canada. The Camp encourages and promotes this pastime, and is thus a means of sending much money into Canada that would otherwise be spent elsewhere. The banquet was noted for the variety of very unusual dishes which were served, among them being kangaroo, tiger, seal, salt horse, and Persian lamb. The tiger was the gift of H.S. Highness Prince Louis of Battenberg, while the other dishes were sent by various distinguished men. The coffee had been cached for a year at the most northern point of land in the world, and was brought back by Commander Peary, who gave a very interesting talk about his adventures in the Far North. Lord Minto had endeavoured to send a choice cut of elephant, but failed from want of proper means of cold storage; however, a cablegram was received from him during the banquet promising to have the elephant for the next dinner of the Camp.

DR. BELL THE GREATEST CAMPER.

Dr. Robert Bell was introduced by Mr. Cy Warman, the toastmaster, as follows:—

We've not only men who write things,
We have also men who do things;
Do things for the joy of doing,
For the very love of doing;
And among these, first among them,
I would write our guest of honour.
If men reap as they sow, and if
'Well done, good and faithful servant,'
Shall be spoken to the faithful
On our future final camp-ground,
Our distinguished guest of honour
Will get his. He'll get the glad hand
Where the great reward awaits him,
Where, says old Chief Hoskaninni,
'Rivers flow with milk and honey,
And tobacco grows like cactus—
By the springs of Happy-water.'
That's a redman's sketch of heaven.

For full half a hundred summers,
And for half a hundred winters,
He has lived out in the open;
He has met old Mudgekeewis,
He has faced the fierce Kewayden.
He has tramped the trail unbroken,
Shooting wild and unknown rapids;
Giving names to unnamed rivers;

Slept upon the cold, bleak barrens;
Felt the bitter pangs of hunger.

Now, at last he is rewarded;
Now, lone letters, marks of honour,
Follow his good name, as children
Run behind a Quebec mother,
Most too numerous to mention.

He has sailed the Bay of Hudson,
Nine times through the Straits of Hudson.
And for good and "faithful service,"
Has been honoured by King Edward—
Had even a greater honour—
Honoured by the common people,
By the men who have worked with him,
By the men who worked beside him,
Walked and slept and starved beside him.

And the name of this explorer—
The Dominion's first explorer—
Will go down in song and story,
Stories written by our children,
Songs sung by our children's children.

I shall take no more of his time,
But, with real pride and pleasure,
Introduce our guest of honour,
Introduce the great explorer,
Doctor Bell, our greatest camper,
Doctor Bell.

Dr. Bell, in replying to the first toast, gave a number of entertaining experiences and some useful hints in regard to camping in the various regions of the Dominion. He said he generally moved camp every day, and during his long service to the Government calculated that he had made fully 6,000 different camps. On motion of General Miles, who is a prominent member, Dr. Bell was unanimously elected a member of the Advisory Board by a standing vote.

COMMANDER PEARY "IN THE GAME."

After it had been announced that Dr. William J. Long had written that owing to an injury to his eyes he was in a dark room with them bandaged, and that Mr. Ernest Thompson-Seton was suffering from a cold caught because he slept indoors one night, Commander Peary spoke. Having told of an Arctic hunt after musk oxen, when his party was famished for food, the explorer referred to his own hopes of reaching the North Pole. "I expect to sit in the game next summer," he said. "I have three deep-seated convictions. I believe that I shall win. Every time that I have played I have had a little better hand. I believe that the attaining of the pole is the work for which God Almighty made me, and I believe that the work has the scope to entitle it to the practical support of every man who has red blood in his veins. I believe that the object is worth the effort because of the scientific results, because of the national prestige, and because the North Pole is the actual northern boundary of the future of the United States."

PORTLAND CANAL MINING AND DEVELOPMENT COMPANY, LIMITED.

Mining Engineer's Report on Company's Property.

GENERAL INFORMATION concerning the Portland Canal district, and some particulars of the Portland Canal Mining and Development Company's mineral claims, were published in the *Mining Record* for September last. Since then that company's property has been visited and reported on by Mr. W. J. Elmendorf, whose report follows:

Property.—This company owns eight mining claims as follows: Gipsy, Herbert, Extension, Mayflower, Sadie, Mosquito, Barney and Richard II. It has also bonded the Lucky Seven and Little Joe mining claims for the sum of \$25,000 of which \$8,000 has been paid, the balance being due on December 15, 1908.

These claims are contiguous, and well located both as regards the mineral veins within their boundaries and the timber and creeks on their surface. They cover nearly 400 acres of well-wooded hillsides, sufficiently steep for advantageous mining by tunnel but not too precipitous for building sites, good trails and roads.

Water.—Glacier Creek crosses the Sadie claim and, with its tributaries, furnishes abundant water for all necessary mining purposes. This creek with proper improvement, is capable of developing an entirely adequate water power for extensive further operations.

Timber.—Abundant timber for all mining purposes is to be had in the immediate vicinity of the workings.

Railway Charter.—In addition to its mining claims, the company owns a railway charter for what is known as the Portland Canal Railway with building rights along the valley of the Bear River and its tributaries—Glacier, Bitter and American Creeks.

Situation.—The mines of the company are located in the Bear River district, Skeena mining division, about five miles in a northeasterly direction from the town of Stewart at the head of Portland Canal in British Columbia. They are about four miles east of the International Boundary line between Canada and Alaska. Glacier Creek, which flows through the land of the company, is a mountain torrent of considerable volume, fed from the eternal ice amphitheatre at the head of the Bear River valley. This valley is a continuation in a northerly direction of the great earth cleft which, at its lower level, forms Portland Canal. It is open, fertile and, for many miles, of easy grade between mountains.

Trail.—The trail from Stewart to the mines rises 2,450 ft. to the workings on the Little Joe claim, but almost this entire altitude is attained in the last 1½ miles where the trail leaves the valley of the Bear and ascends the mountain side.

Geology.—At the time of my visit to the property there was about 2 ft. of snow on the ground and all

my work was done at very early morning, when quantities of frost at the ground surface formation was visible. My impressions concerning it must not therefore be considered final. The country rock is made of slate similar to that of the Skeena district, also in British Columbia. These sedimentary rocks are intersected by dykes in form of porphyry. One striking feature is that with quartz veins extend through the slates and possibly the porphyry, and may in places follow the line of contact between the sedimentary and igneous rocks. My examination, for the same reason, was confined to the Little Joe vein but I am informed that other good showings exist elsewhere on the property.

Little Joe Vein.—This vein is a fissure in slate and has been traced on the surface through the Lucky Seven, Little Joe, Gipsy, Mayflower, Mosquito, and Richard II claims, a distance of more than 6,000 ft. Its strike is approximately north and south and it dips to the west at an angle of 20 deg. to the horizontal. The normal gangue of this vein is quartz and, as is usual in slate veins, much of its filling consists of portions of the country rock re-cemented by the deposition of quartz or ore from the mineralizing solutions. The vein has an average width of about 8 ft. and is strong, apparently free from faultings and well mineralized.

Ores.—The most abundant ores are pyrite, pyrrhotite, galena, blende and chalcopryite carrying gold and silver values. Native silver is present in considerable amounts in those portions of the vein where conditions have been favourable to its deposition. While I do not attach much importance to its presence *per se*, in this particular its occurrence in quantities too large to be negligible may indicate the immediate neighbourhood of bodies of high-grade silver ores. The gold values are most persistent but irregular, and high assays, which have been obtained from quartz samples showing no mineralization, suggest the presence of tellurides.

Development and Assay Values.—Three tunnels have been driven on the vein on Little Joe ground and, in addition, several open cuts and shots on the surface expose its outcrop. The vein is comparatively flat and a steep gulch exposes the outcrop on one of its sides and almost along the dip of the vein. This rather unusual but favourable condition allows successive tunnels to be driven in the hillside on the strike of the vein. Grounds for consolidating through barren ground is thus done away with and every foot of work done is advantageous development of the property.

In the development of this mine undue prominence should not be given to the assumption that richer ore will be encountered with depth. There is no good reason for such a supposition, and experience points to the fact that these veins rather decrease than increase in the grade of the ore as the lower level is attained. The ore is more likely to occur in shoots rather than zones and these shoots are usually richer nearer the surface. Depth is desirable in any

mine as opening more ore but it does not follow that it will be better.

Tunnel No. 1, the uppermost, was in a distance of 26 ft. at the time of my examination in November, 1907. The first 8 ft. from the portal is partly in the hanging wall and the remaining 18 ft. all in ore. An average sample of ore from this tunnel taken by me from the last 16 ft. of its length assayed: Gold 0.25 and silver 14.2 oz. per ton, and lead 5.2 per cent.; total value, \$18.88 per ton. When the manner of taking this sample is considered, this is a good showing, as the ore can be sorted to \$50 per ton by simply picking.

A roughly selected sample, taken by me from this orebody assayed: Gold 0.25 and silver 26.4 oz. per ton, and lead 23.2 per cent.; total value, \$44.20 per ton.

Tunnel No. 2, 150 ft. below No. 1, is in 126 ft. At a point about 65 ft. from this portal a short cross-cut is run to the east; a second cross-cut extends a distance of 12 ft. in the same direction from a point 100 ft. from the portal. Some good ore shows near the portal and 50 ft. in the main orebody is exposed extending to the second cross-cut, a distance of 35 ft., and showing a width of 12 ft. in this working. From this cross-cut to the face of the tunnel is too far to the west to follow the main orebody, although scattered mineralization shows in the face.

A general sample, taken by me from every 3 ft. of the walls and roof, for a distance of 35 ft., between the two cross-cuts, assayed: Gold 0.21 and silver 6.8 oz. per ton, and lead 3.2 per cent.; total value, \$11.62 per ton.

An average sample from the second cross-cut, of 10 ft. in width of ore, assayed: Gold 0.31 and silver 10.4 oz. per ton, and lead 2.9 per cent.; total value, \$15.54 per ton.

These ores are of the same general character as that in No. 1 tunnel and should easily be sorted to the value of \$50 per ton.

A sample of the ore from the face of No. 2 tunnel assayed: Gold 0.12 and silver 2.0 oz. per ton, and lead 0.4 per cent.; total value, \$4.08 per ton.

Tunnel No. 3, 180 ft. below tunnel No. 2, has a total length of 115 ft. This working leaves the vein about 30 ft. in from the portal and swings to the west along a local slip in the slates which might easily be mistaken for the vein. Veins in slate rarely show a well defined selvage or parting seam of gouge along their walls, and fissures in the wall rocks, more or less extensive, are often followed for short distances under the impression that the work is in vein matter. It seems plain in this case after a rough, compass survey of the tunnel, that the vein has not been followed for more than the distance mentioned. From the face of No. 3 tunnel a cross-cut has been driven 14 ft. in a southeasterly direction. A sample of slightly mineralized quartz from the face of this cross-cut showed practically no value.

Transportation.—There are no serious obstacles in the way of cheap transportation with proper facilities provided. Anticipating the development of orebodies of sufficient size and grade to warrant such construction, a tram from the mine to Bear River valley, a railway or good wagon road from its lower terminal to the head of Portland Canal, and a wharf at this latter point, suggest themselves as the best and most economical means of putting the ore on board ships or barges for delivery to any one of the Coast smelters.

Railway.—As above mentioned, this company owns a railway charter covering the valley of the Bear River and its tributaries. The proposed main line is 25 miles in length and the branch lines 15 miles each. On the tributary creeks are located many promising prospects. The ores in these properties are mainly those of lead and silver with some gold. There are some copper prospects in the district. With the facilities afforded by railway transportation and possibly a concentrating mill to handle such low grade ores as this process is applicable to a mining district of importance may be developed. During the development of these mines the railway should be operated profitably by hauling down logs from the larger timber areas of spruce which line the valleys. These timber limits are said to show 30,000 ft. to the acre, but cannot be utilized at present as the river is not suitable for driving.

Opinion.—I have seen the certificates of assay of many samples taken by the management from these three tunnels but they cannot be properly embodied in this report. These results have, however, assisted me in coming to the conclusion that the ore now in sight can be sorted to a grade that will render it profitable.

The very high values shown by some of the samples, as well as the character of the vein and ore, point to the probability of high-grade ore bodies being found by future exploration.

The ores do not suggest that concentration by the ordinary methods would save any large proportion of their values and the mixed sulphides render any cyanide process of doubtful application.

Recommendation.—Tunnel No. 1 should be driven ahead on the vein as the showing on the face is most promising. A good orebody will, in all probability, be opened here by a small amount of work and expense.

Tunnel No. 3 should be contained from a point 30 ft. in from the portal, at an angle to the east about the same as it now swings to the west, and the vein followed. Ore should be encountered almost at once and no difficulty will be found in following the vein once the working properly enters it. This work is of the utmost importance and should be prosecuted diligently. Tunnel No. 2 may also be continued on the vein, but I do not consider the work at this point as important as that in tunnels Nos. 1 and 3.

The Nicola Coal Mines, Limited, working on Lindley Creek, reports that it has a 5-ft. seam of good coal and that the tunnel it is driving will cut this seam. Work is being continued through the winter, a contract for the further extension of the tunnel having recently been let.

COMPANY MEETINGS AND REPORTS.

HASTINGS (BRITISH COLUMBIA) EXPLORATION
SYNDICATE, LIMITED.

The tenth ordinary general meeting of the shareholders of the Hastings (British Columbia) Exploration Syndicate, Limited, was held in London, England, on October 22, ulto. The directors' report and balance sheet for the last financial year were submitted, as follows:

DIRECTORS' REPORT.

The directors beg to submit the ninth annual statement of accounts and balance sheet for the year ended March 31, 1907.

The issued capital of the company remains at 60,375 shares of £1 each fully paid up, amounting to £60,375.

The financial position of the company exhibits—Cash at bankers, London, and in British Columbia £1,683 14s. The administration expenses for the year at head office and Nelson amounted to £2,448 1s. 1d., which has been the normal expenditure for several years past, and includes ore tax and fire and accident insurance.

The cost of development work at the Arlington mine shows an increase of £556 13s. 9d. as compared with last year, but £258 11s. 10d. was incurred in connection with the acquisition of a lease of the Canadian King claim adjoining the Arlington mine.

The net result of the ore shipped to the smelter (that is, after deducting freight and treatment) was £9,574 9s. 1d., which compares with £10,070 5s. 8d. realized for the year 1906, and £10,099 16s. 10d. for the same period of 1905. There has been a marked decline in the grade of the ore and the cost of winning the gold has considerably increased.

The directors continue the procedure adopted by them on previous occasions (of which the shareholders have expressed their appreciation) by appending copious extracts from the annual report dated August 2 last, furnished to them by Mr. Leslie Hill, the company's local manager and consulting engineer in British Columbia, who continues zealously to perform his duties in the interests of the shareholders:

"Arlington Mine.—The development work done comprised 998 ft. of drifts, 249 ft. of cross-cuts, 50 ft. of winzes, 132 ft. of raises and 85 ft. of old drift reopened, making a total of 1,514 ft. during the year.

"The total cost for labour on this work was \$11,284.53, making an average cost of \$7.45 per ft. The ground has been much harder, and the cost per foot is \$1.47 more than that of last year.

"From the mine were taken 1,533 mine-cars of ore and 9,538 mine-cars of waste. A large amount of waste was used in filling in the stopes, as several of the old stopes were cleaned up of ore and filled with waste. I should estimate that there were fully 10 tons of waste broken down to every ton of ore shipped.

"There were 32 carloads of ore, or 712,944 tons, hauled by wagon, and 29 carloads, or 695,986 tons by sleigh, making a total of 1,408.98 tons shipped during the year.

"The gross value of the ore shipped was \$64,837.93, equal to \$46.02 per ton, and the net smelter value, including lead bounty (\$53.32), was \$52,076.24, equal to \$36.96 per ton.

"The cost of mining and shipping was \$40,224.83, leaving a gross profit of \$11,851.41. The cost per ton of ore shipped was \$28.55, which would equal a cost of \$2.60 per ton mined.

"The cost of mining, sorting, and shipping was distributed as follows:—

	Total Costs.	Average per Ton.
Development (labour)	\$11,284.53	\$ 8.01
Stopping	11,868.23	8.43
Sorting and tramming	5,013.47	3.57
Timbering	428.75	0.31

Mine surface and general expense (including assaying and surveying)	2,501.56	1.72
Supplies	3,787.65	2.70
Hauling to Erie and loading on cars	3,689.24	2.63
Insurance	524.03	0.38
Ore tax	853.42	0.61
Boarding house working (supplies on hand)	142.31	0.10
Miscellaneous expenses	131.64	0.09

Total cost of mining and shipping

\$40,224.83	\$28.55
-------------	---------

"The cost of development per ton of ore shipped was higher and the cost of stopping lower than last year. The total cost for mining, sorting, and shipping was \$2.71 per ton lower than last year, but the net value per ton was \$5.85 less, making the gross profit \$3.14 per ton less than last year.

"The Dominion Government bounty on lead depends upon the London price of lead, and is not paid at the present price. As the smelter does not pay for the lead in this ore (it being below 5 per cent.), the bounty not now being paid has made a difference of 27 cents per ton of ore shipped.

"Development.—The No. 7 (779 ft.) north level has been driven through the Canadian King ground and continued in your ground. Very little ore was found in the Canadian King ground. I followed up the best showing, for a few feet, but it did not lead to any ore body. The principal development has been done in a northerly direction on the Nos. 8, 9, and 10 levels. The vein made another roll, which necessitated an intermediate level, called No. 9, and the ore stoped during the year was taken principally from the Nos. 8 and 9 levels. There are two pieces of ground on these levels to be stoped this summer, and a little ore above the No. 8 level to be cleaned up. There is at present no ore in the north faces of the Nos. 8 and 9 levels. There has been an improvement during the last few days in the No. 7 north drift and indications that ore will be found again in this direction.

"I have been endeavouring to locate the vein near the old Micawber workings, but without success up to the present. We drove one level, just above the old workings, 196 ft., and raised 15 ft., not finding the vein. We have started a second adit above the first one, where there was a showing of mineral. This ore looked very good, but assays showed it to be of very low grade, and the vein dipped in the wrong direction and went under the level. In this drift we have encountered a nearly perpendicular dyke of hard porphyry, similar and parallel to the dyke which cut off the Head Arlington ground to the east. We appear now to be getting through this dyke, and there is some quartz in the face of the drift. I am anxious to locate the vein in this direction, in order to decide which will be the most economical way to develop the mine at a lower depth.

"The wages of all classes of labour have increased during the year, and on June 1, I raised the wages of all men employed at the mine 25 cents per day. At the same time the prices of all supplies have been raised, which makes it very difficult to operate at a profit.

"East Kootenay Claims.—No work has been done on these claims during the year, and it does not appear that the developments exposed by the North Star Mining Company have increased the value of your properties, but prospecting in the neighbourhood is still being carried on."

Blairmore Coal Lands.

The third instalment on these properties, with interest to date, was paid to the Dominion Government of Canada on June 1 last, but the amount having to be remitted beforehand to Ottawa, the items appear in the present balance sheet. The final payment to the Government will be due on June 1, 1908.

A negotiation for sale of this company's interest in these coal lands was lately in progress, but your directors regret to state that the matter did not proceed, and accordingly a deposit and instalment, amounting together to \$3,300, became forfeited to this company.

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	£	s.	d.	
Capital Account—				
Nominai				
(100,000 shares of £1 each)				
Issued 60,375 shares of £1 each, fully called up				
Blairmore Coal Lands—Amount of deposit received on option to purchase, and since forfeited				
Sundry Creditors in British Columbia				
	£61,149	7	11	
Assets and Expenditure—				
Purchase Account				
Property Account—				
Mining claims at East and West Kootenay, as per last balance sheet	18,811	6	3	
Canadian King—Purchase of lease	6	1	10	
Blairmore Coal Lands (expenditure in respect of interest in), as per last balance sheet.	5,103	6	2	
Expended since	1,426	19	8	
Plant, Machinery, Buildings, Live and Dead Stock (as per last balance sheet)	9,623	2	5	
Expended since	107	3	4	
Canadian Publishing Company, 10 shares of £2 each fully paid				
Cash at Bank, London (Current Account)	234	12	8	
" " British Columbia (Deposit Account)	£1,447	16	0	
Less Current Account	2	9	8	
Cash in hand, London	3	15	11	
Expenditure—				
Balance brought forward from last balance sheet, May 31, 1906	23,101	4	11	
Expenditure (London) from June 1, 1906, to May 31, 1907, and (British Columbia) from May 1, 1906, to May 31, 1907:—				
London Office expenses	350	0	0	
Audit fee, 1906 (London)	36	15	11	
Petty cash, stationery, cablegrams, and miscellaneous expenses (London)	58	7	8	
Income Tax	59	10	10	
Insurance, accident and fire (British Columbia)	104	16	3	
Government ore tax (British Columbia)	170	13	8	
Salaries in British Columbia and Nelson Office expenses	1,591	15	9	
General expenses (British Columbia)	76	2	13	
Development Expenses—				
Arlington group	7,020	19	8	
Fort Steele claims	15	16	11	
Sunlight	1	7	8	
Canadian King	258	11	10	
	£166	6	10	
Deduct Interest and exchange	2	6		
Transfer fees				
	£10,404	11		
Deduct Expenses	840	15		
	£9,563	15	10	
Lead bounty				
	9,574	1	2	
Dividend of 1s. per share on 60,375 shares (March, 1902).	3,018	15		
Dividend of 1s. per share on 60,375 shares (March, 1905).				

The chairman, Mr. James Head, in moving the adoption of the report and accounts, said:—

"The report and accounts for the past year are not such as call for much comment by me. You will notice that, in common with other employers of labour in Western America, we have been obliged to increase the rate of wages to our miners, which has naturally resulted in an increased cost of winning our ore. This has been accompanied by a decline in the value of the ore sent to the smelter from \$42.81 per ton last year to \$36.96 during the period under review, or a falling off of our revenue of about £500—not a very serious matter, though one for regret. The difficulty, as I have often before explained, is not in the quality of the ore—which even at \$36.96 is abnormally rich—but to keep a grasp on the ore shoots, which are not only narrow, but elusive, and in order to follow them we are often put to much expense in doing dead work.

"The item appearing in the accounts as 'Amount of Deposit received on option to purchase our coal lands' refers to a negotiation which fell through, owing to the inability of the would-be purchaser to find the necessary funds within the stipulated time. In the present condition of the money market this is not to be wondered at, and shareholders need not feel alarmed that the failure to complete was due to an unsatisfactory condition of the coal fields. As a matter of fact, no examination ever took place, and your property has in no way suffered depreciation."

The report and accounts were adopted without discussion; the retiring director, Sir Edward Birbeck, Bart., was re-elected; the auditors were re-appointed, and the meeting closed with the customary vote of thanks to the chairman.

CASCADE WATER POWER AND LIGHT COMPANY, LIMITED.

On November 7 the *Nelson Canadian* published the following:

"The consummation of a deal of more than passing importance was effected last evening when the shareholders of the Cascade Water Power and Light Company, Limited, met and authorized the issuance of a series of seven hundred and fifty \$500 gold bonds, bearing four and a half per cent. interest, aggregating \$375,000 guaranteed by the West Kootenay Power and Light Company, Limited, for delivery to the Cascade (1906) Power Company, Limited, in payment for the assets and undertaking of the Cascade Company.

"This gives the West Kootenay Company complete control of the power business in Yale and Kootenay districts, and is the outcome of the bitterly contested fight between these rival companies a year ago before the provincial legislature.

"The necessary documents affecting the transaction were authorized at the meeting held yesterday, which occupied several hours.

"S. S. Fowler, M.E., president, John Fraser, secretary, and LeBaron deVeber, as directors, will retire shortly and be replaced by the nominees of the West Kootenay Company.

"The English companies and trustees concerned were represented throughout by Mr. R. S. Lennie, of the firm of Lennie & Wragge, and the West Kootenay Company by A. H. McNeill, K.C., of Rossland.

NORTH STAR MINING COMPANY, LTD.

The directors report that during the summer diamond drilling was carried on over a small extent of the company's property, until operations were stopped by weather conditions. Some of this work was encouraging, but no new large bodies of ore were discovered.

The mining operations during the last six months have been fairly satisfactory. Additional small bodies of ore have been found in the old workings, from which ore has been shipped at the rate of about 300 tons per month. The value of this ore has averaged about \$14 per ton, after deducting freight and treatment charges, but not mining expenses. The company's manager reports that there is at present in sight about 1,500 tons, which will enable the company to continue shipping at the same rate during the winter months.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia—

Le Roi—October: Shipped from the mine to Northport during the month 8,675 tons, containing 2,667 oz. gold, 4,250 oz. silver and 208,000 lb. copper. Expenditure on development work, \$11,500.

Le Roi No. 2—October: Josie mine report—Shipped 2,310 tons. The net receipts are \$31,670, being payment for 1,955 tons ore, and \$610 for 40 tons concentrates shipped, in all, \$32,280.

Le Roi No. 2—October: Vancouver mine report—Crushed 1,444 tons, yielding 90 tons lead concentrates and 154 tons zinc concentrates. Shipped 60 tons lead concentrates. The net receipts are \$5,662, being payment for 59 tons lead concentrates."

Snowshoe—October: Lessees shipped 25,000 tons. The preliminary royalties on this ore amount to \$4,750.

Tyee—October: Smelter ran 22 days, treating 502 tons of Tyee ore, value (after deducting refining charges) \$6,535, and 4,655 tons of custom ore, making a total of 5,157 tons, and producing 510 tons of matte.

U. S. A.

Alaska Mexican—October: 120-stamp mill ran 29½ days, crushed 19,920 tons ore; estimated realizable value of bullion, \$32,263. Saved 305 tons sulphurets; estimated realizable value, \$19,111. Working expenses, \$23,812.

Alaska Treadwell—October: 240-stamp mill ran 25¼ days, 300-stamp mill ran 27½ days, crushed 77,637 tons; estimated realizable value of bullion, \$68,209. Saved 1,400 tons sulphurets; estimated realizable value, \$56,532. Working expenses, \$81,244.

Alaska United—October: Ready Bullion Claim—120-stamp mill ran 29 days, crushed 19,540 tons ore; estimated realizable value of bullion, \$21,207. Saved 330 tons sulphurets; estimated realizable value, \$10,503. Working expenses, \$22,797.

DIVIDENDS.

The Directors of the North Star Mining Company, Limited, operating the North Star mine at Kimberley, East Kootenay, have declared a dividend at the rate of two cents per share, payable on December 20 to all shareholders of record at noon of December 10. The dividend list of the *Engineering and Mining Journal* shows that 1,300,000 shares have been issued and that the last dividend was at the rate of \$1 per share, paid in December, 1904.

The customary quarterly dividend of the Granby Consolidated Mining, Smelting and Power Company, Limited, will, it is understood, not be paid in December, owing to a suspension of operations at its mines and smelter.

The Consolidated Mining and Smelting Company of Canada, Limited, paid its quarterly dividend (No. 7) early in November, but this time the amount was at the rate of five per cent. per annum instead of ten per cent. as paid on previous distributions of profits. If none of the stock held in the treasury at the close of the last financial year has since been issued the total of the last-declared dividend is \$60,422.50. The widely-circulated statement that a total of \$133,880 had been paid in November is erroneous. In fact no occasion has so large a sum been paid to the shareholders. It has been announced that the reduction of the dividend from the usual rate of 10 per cent. per annum has been thought desirable in view of large expenditures during the year on capital account for permanent improvements to the various properties of the company and to the fall in the prices of metals during the past few months.

The Canadian Gold Fields Syndicate, Limited, recently paid its fourteenth dividend. The amount is reported to have been seven-eighths of one per cent. on the capital stock of the company, which is \$600,000 divided into 6,000,000 shares of ten cents each. At this rate the total of this distribution would be \$5,250. The syndicate owns 4,260 shares in the Consolidated Mining and Smelting Company of Canada, and derives its revenue from dividends paid by that company.

TRADE NOTES AND CATALOGUES

The Canadian Rand Company, Limited, of Montreal, Quebec, has issued a new catalogue of its "Compressed Air," in which are briefly outlined three systems, viz., No. 110, the Westinghouse Oil Switches and Circuit-Breakers; No. 113, the Westinghouse Electrostatic Voltmeter, and No. 114, the Westinghouse Electrolytic Lighting Arrester Type E.

Mussens Limited, of Montreal, Quebec, have in stock for immediate sale some Impact Screens and Fittings. These screens are used for the efficient sizing of ores, wet or dry, in their treatment by concentration and cyanidation.

From Peacock Brothers, engineers, of Montreal, Quebec, has been received a 338-page catalogue of patent safety boiler mountings, patent valves and high-class steam specialties, manufactured by J. Hopkinson & Co., Ltd., of Huddersfield, England, for which company Peacock Brothers are sole Canadian agents. This catalogue (No. 660) contains a large amount of information concerning the manufactures above mentioned and, being freely illustrated as well, is of particular interest to users of steam boilers and other appliances. Anyone desiring a copy can obtain it by applying to Peacock Brothers.

The Westinghouse Electric and Manufacturing Company of Pittsburgh, Pa., has sent out two circulars—No. 1089, Westinghouse U. 101-B2 Railway Motor, Direct Current, and No. 1122, Standard Three-Point Railway Diverter. Both are illustrated and give descriptions of the apparatus mentioned. The same company has had reprinted from the *Engineering Magazine* of New York (as a bulletin) an illustrated descriptive article on "Electric Machinery for the Operation of Mexican Mines," by Charles V. Allen.

A lot of electrical machinery has recently been received by the Western Fuel Company, Nanaimo, from the Canadian General Electric Company, Limited, Toronto, Ontario.

BOOKS REVIEWED.

A Manual of Fire Assaying. By Charles H. Fulton, president of the South Dakota School of Mines. Pp. 164, 6x9 in., fully illustrated; cloth, \$2 postpaid. New York, 1907; Hill Publishing Company.

In his preface to this book the author (who has had experience with practically all of the methods of assay discussed in it, first as a manipulator, then as a teacher, and finally in charge of works), intimates that he has long recognized the need of a work on fire assaying that would treat the subject from a scientific and rational point of view rather than from that of the "rule of thumb," which latter, he states, strangely enough governs most modern works on the subject.

The book is intended for the use of students in technical schools and for the assayer in actual daily practice who frequently feels the need of a reference book. It is closely confined to the subject of fire assaying, which it treats in detail. There are in all 14 chapters, commencing with assay furnaces and tools, then dealing with definitions, reagents, sampling, weighing, reduction and oxidation reactions, and proceeding to the crucible assay and assay of slags, then to cupellation and parting, respectively, and afterwards to the assay of various ores, metals, etc. Special methods of assay are treated in a separate chapter. Some of the chapters outline scientifically the principles of assaying, in particular those on "Reduction and Oxidation Reactions," "Crucible Assay and Assay Slags," and "Cupellation." A large part of these chapters is new and parts of their contents are presented for the first time. The chapter on the "Errors in the Assay for Gold and Silver" outlines and discusses the accuracy of the assay in greater detail, it is claimed, than has been attempted before.

authority

and full-page plates. Cloth, \$2.50. New York, U.S.A.,

& Hall, Limited

This is a second edition of Mr. Wilson's book. The author says: "The demand for the first edition of this work, and the measure to the great returns from this species of work, as

of the placers, has led the author to present this second edition.

free gold, as well as great improvements in the machinery for handling the material, and in the application of new machinery to placers where unusual difficulties were encountered in working them.

"All these considerations have led the author to issue the new edition, which in his opinion, brings this work abreast of the latest improvements in this industry."

While this book possesses much merit in many respects, particularly in regard to the general information it gives, it is unfortunately unreliable so far as it deals with the "Mining Regulations for the Canadian Yukon." It quotes those "approved by Order in Council dated Ottawa, January 18, 1898." It is much to be regretted that the important changes since made have been overlooked. Just to give one instance of unreliability—Regulation No. 30 is quoted, commencing with the following sentence: "A royalty of 10 per cent. on the gold mined shall be levied and collected on the gross output of each claim." A Dominion Government advertisement now running in Yukon newspapers says: "Royalty at the rate of two and one-half per cent. on the value of all gold shipped from the Yukon Territory shall be paid to the Comptroller." Further, the information relating to British Columbia, which Province up to the end of 1906 had produced placer gold aggregating in value \$68,000,000 is very meagre, and this together with the mis-information above mentioned suggests that the author of this book is not well informed concerning hydraulic and placer mining in Canada. However, apart from these defects the book should prove useful to many engaged in hydraulic and other methods of placer mining.

Hydrometallurgy of Silver. By Ottokar Hofmann. Pp. 336, 6½x9½ in.; cloth, \$4 postpaid. Hill Publishing Co., 505 Pearl street, New York.

This book comes as a most valuable addition to the existing literature on the extraction of silver by lixiviation, particularly as it deals so very thoroughly with that most crucial part of the process, chloridizing roasting, nearly one-half of the volume being devoted to that subject.

The handling of complex mixtures and calcareous gangues is treated at length and the chapter on the chloridizing of argentiferous zinc-lead ores is particularly interesting and instructive.

The subject of lixiviation by means of various solvents is gone into minutely, while an interesting feature of the publication is a chapter on the cyanidation of silver ores—a subject today little understood, but nevertheless attracting much attention.

R. G. Drinnan of Fernie, has resigned as general superintendent for the Crow's Nest Pass Coal Company, Ltd., to take a similar position with the Pacific Coal Company which is opening a coal mine near Hosmer, also in the Crow's Nest Pass. On the eve of his leaving Fernie Mr. Drinnan, who had been with the Crow's Nest Pass Coal Company since April, 1901, was presented by the company's coal miners and office staff with a valuable silver service, an expensive fur coat and a purse of gold, in token of the esteem in which he is generally held. He was also given a valedictory dinner by the citizens of Fernie.

CONSTRUCTION NOTES.

The Hewitt Mining Company has nearly completed the construction of a Crawford aerial tramway between the portal of the tunnel at the No. 6 level of the Hewitt mine, near Silverton, Slocan, and the Wakefield Concentrating mill on Four Mile Creek, a distance of 5,600 ft. The difference in elevation between terminals is about 2,000 ft. It is stated that an air compressor has been ordered for this mine.

The Slough Creek, Limited, which is operating a deep-drifting gold mine on Slough Creek, in the Cariboo district, has adopted the recommendation of its local manager, H. H. Watters, to substitute hydro-electric power for steam as power for its big pumps and other machinery. The preliminary work of getting out logs for a dam to be built across Slough Creek will be commenced shortly.

The Vancouver Power Company is completing the installation of a 10,000-h.p. unit at its power station a few miles from the city of Vancouver. This is in addition to four 3,000-h.p. units put in several years ago. Two more 10,000-h.p. units are to be installed, this work to be commenced early in 1908. The company supplies electric power for the operation of street railways in Vancouver and New Westminster and suburban lines, power for various industrial works, and light to the two cities named and the surrounding districts.

An Elmore vacuum oil plant is to be installed at the Giant mine zinc-lead mine in the Golden mining division. The machinery for it has been received and is being put in place under the direction of H. H. Claudet of Rossland, the Elmore Company's representative in British Columbia.

THE H. S. SUPPLY CO.

THE MACHINERY DEPOT OF THE WEST

BOLIXES

- 4—250-h.p. Babcock & Wilcox water tube.
- 1—125-h.p. 84x12 internally fired.
- 3—100-h.p. 66x16 horizontal tubular.
- 3—80-h.p. 60x16 horizontal tubular.
- 2—70-h.p. 54x16 horizontal tubular.
- 1—60-h.p. Heine.
- 1—60-h.p. horizontal tubular.
- 2—50-h.p. 48x16 horizontal tubular.
- 1—50-h.p. 48x12 horizontal tubular.
- 1—50-h.p. 48x10 vertical.
- 1—40-h.p. 48x7 vertical.
- 1—30-h.p. Scotch marine type.
- 1—25-h.p. 42x10 and 1—20-h.p. 36x10 horizontal tubular.

COMPRESSORS

- 18x30x26x16x24 Laidlaw Dunn Gordon cross compound.
- 16x18x11x22 Leyner two-stage tandem.
- 10½x12x7x14 Leyner two-stage tandem.
- 14x16x9½x16 Norwalk.
- 6½x8 Leyner upright belted.
- 12x18½x12½x12 Ingersoll-Sargeant.
- 8x8x5x10 Norwalk.

ENGINES

- 24½x42x48 Harris cross compound.
- 24x42x48 Hamilton cross compound.
- 18x34x48 Allis Corliss compound.
- 18x42 Fraser & Chalmers Corliss.
- 18x36 Allis Chalmers Corliss.
- 13x12 Ball automatic.
- 9½x10 Armington Sims automatic.
- 14x20 Atlas slide valve.
- 7x9x12 American cross compound.
- 14x20 Atlas automatic.
- 10x12 Taylor automatic.
- 12x16 Brownell slide valve.
- 8x10 Nagle slide valve.

HOISTS.

- 4x6 Bolthoff double cylinder.
- 5x6 and 2. 6x8 Kennedy & Pierce double cylinder.
- 5x6 Hendy & Meyer double cylinder.
- 10x12 Hendrie & Bolthoff double cylinder.
- 10x12 Murray friction clutch, double cylinder.
- 10x12 and 12x16 Vulcan geared double cylinder.
- 14x16 Hendrie & Bolthoff geared, double cylinder.

CONCENTRATING TABLES

- 2 No. 5 Wildley tables. 2—Card tables.
- 20 6-ft. Frue vanners. 1—4-ft. Frue vanner.

TH S. H. SUPPLY COMPANY.

"The Machinery Depot of the West,"
2044 Larimer St., DENVER, COLO., U.S.A.

COAL MINES REGULATION ACT.

BOARDS OF EXAMINERS.

NOTICE is hereby given that the following constitute the Boards of Examiners for the various Collieries during the year 1908:—

CUMBERLAND COLLIERY.

Appointed by the Owners Charles Matthews.
Alternates—David Walker,
David Nellist.

Appointed by the Lieut.-Governor in Council—John Kesley.

Elected by the Miners—Joseph W. Horbury.
Alternates—Alexander McNeil,
Thomas Leeman.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. John Kesley, of Cumberland, B.C.

EXTENSION COLLIERY.

Appointed by the Owners—Alexander Bryden.
Alternates—Alexander Shaw,
William Jones.

Appointed by the Lieut.-Governor in Council—W. G. Simpson.

Elected by the Miners—James Glen.
Alternates—Thomas Doherty,
William Anderson.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. W. G. Simpson, Ladysmith, B.C.

NANAIMO COLLIERY.

Appointed by the Owners—George Wilkinson.
Alternates—Charles Graham,
John Newton.

Appointed by the Lieut.-Governor in Council—Thomas Budge.

Elected by the Miners—John Carr.
Alternates—George Moore,
Daniel Livingston.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. Thomas Budge, Nanaimo, B.C.

MICHEL COLLIERY.

Appointed by the Owners—John Bastian.
Alternate—Joseph Thomas.

Appointed by Lieut.-Governor in Council—Robert Middleton.

Elected by the Miners—Thomas George Harries.
Alternates—Frank Campbell,
Charles Fuchs.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. Robert Middleton, Michel, B.C.

COAL CREEK COLLIERY.

Appointed by the Owners—David Martin.
Alternates—John Hunt,
Harry Miard.

Appointed by Lieut.-Governor in Council—John McCliment.

Elected by the Miners—Robert Adamson.
Alternates—Joseph Lane,
Abraham Brown.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. John McCliment, Coal Creek, B.C.

NOTE.—Alternates act as Members of the Board in the absence of those regularly appointed or elected to act thereon.
Dated this 23 day of December, 1907.

RICHARD MCBRIDE,
Minister of Mines.

MINING MEN AND AFFAIRS.

John B. Hobson is now at his home in Victoria.

S. F. Parrish, now of Los Angeles, California, has been examining mining properties in Arizona, U.S.A.

James Derbyshire is now superintendent of the Crow's Nest Pass Coal Company's Michel colliery.

T. J. Corwin has been experimenting with black sand obtained from gold-bearing streams in the Cariboo district.

W. M. Brewer has returned from a visit to Tonopah, Nevada, U.S.A.

Capt. Joseph Argall, of the Iron Mask mine, Kamloops, was a visitor to the coast early in November.

W. J. Watson, manager of the Tyee Copper Company's smelter at Ladysmith, was in Victoria lately to meet some Alaska mine owners.

Thos. R. Stockett, general manager of the Western Fuel Company, of Nanaimo, has returned from a visit to California.

Ed. Bridge, of Michel, has been appointed to superintend the work the Crow's Nest Pass Coal Company is having done at Carbonado, on Morrissey Creek.

C. E. Oliver, who a short time ago went up to Tete Jaune Cache to see mica claims, left Kamloops for Spokane on November 30.

Eugene Miltenberger has arrived at Nelson to superintend the operation of the works the Canada Zinc Company to be erected there.

P. Davidson Ahier, who had charge of recent operations at the Cariboo-McKinney gold-quartz mine, Camp McKinney, has been visiting the Slocan.

R. Roberts, manager of the Jewel mine, a gold-quartz property situated in Long Lake camp, Boundary district, has been spending a few days at Victoria.

R. D. Featherstonhaugh, who has been in charge of different hydraulic gold mining enterprises at Atlin during several years, lately spent a few days at Whitehorse.

W. T. Copeland, manager of the Cariboo Gold Mining Company (a Guggenheim incorporation), recently arrived on the coast from Bullion, Cariboo.

Joseph Wendle, well known in the Cariboo district, has gone to the southern States to spend the winter with relatives there.

James McGregor, inspector of metalliferous mines for the West Kootenay and Boundary districts, paid an official visit to the Similkameen in November.

Geo. H. Barnhart of Nelson, formerly manager of the Ymir mine, in the Nelson mining division, is on a visit to Colorado, U.S.A.

J. M. Ruffner, general manager of the Pine Creek Power Company and the North Columbia Gold Mining Company, is down from Atlin. He will probably spend the winter months in the United States.

Blanchard M. Snyder, superintendent of the British Columbia Copper Company's smelting works at Greenwood, Boundary district, has gone to California for the winter.

F. H. Sherman has been re-elected by acclamation district president of the United Mine Workers of America for District 18, comprising southeastern British Columbia and southwestern Alberta.

A. Carmichael, manager of the Otter Creek Company's hydraulic gold mining operations in Atlin camp, came down from the North early in November and spent several days with relatives in Victoria.

Robert Smart, Dominion Government assayer at Whitehorse, southern Yukon, has been notified of his election as a member of the American Institute of Mining Engineers.

Special Agent for the Department of Mines, in charge of the Cariboo, Boundary and Kamloops districts, has been notified of his election as a member of the American Institute of Mining Engineers.

He will probably spend the winter months in the United States.

making a trip to Australia, leaving Vancouver by the Western Express.

C. H. Parks, of Boston, Massachusetts, U.S.A., has been interesting himself in mineral claims on Moresby Island, Queen Charlotte group, where he spent several recent months.

Herbert Carmichael, provincial assayer, has resumed his ordinary duties in Victoria after having spent the greater part of the summer and autumn in the Alberni district obtaining information for a report thereon.

John Hopp reached Victoria from Barkerville on November 8 after having been engaged for several months in hydraulic gold mining on several Cariboo properties he holds.

A. C. Garde, formerly manager of the Payne Mining Company, Slocan, has been appointed manager of the La Plata mine, near Nelson, in succession to Capt. T. H. Trettheway, resigned.

Capt. Harry Johns, superintendent of the British Columbia Copper Company's Napoleon mine, near Marcus, Washington, U.S.A., was in Los Angeles, California, recently.

E. M. Sandilands, for years resident at Sandon, Slocan, from which place he removed some months ago, has been appointed stipendiary magistrate and deputy mining recorder at Jedway, Moresby Island, Queen Charlotte group.

G. A. Singer has returned to Livingstone Creek, southern Yukon, where, according to the *Whitehorse Star*, he will engage in winter mining on a rather extensive scale, on a hydraulic gold mining property on that creek.

R. W. Brock has been appointed acting director of the geological branch of the Dominion Department of Mines. The director, Dr. A. P. Low, who is also deputy minister of mines, continues too ill to perform his official duties, so he has been granted further sick leave.

manager for the Slough Creek, Limited, has returned to England after having visited Australia and New Zealand. He will probably stay in the old country for a short time before resuming work.

Randolph R. Bruce, of Wilmer, East Kootenay, on his return trip from Victoria visited the Canadian Metal Company's Blue Bell mine, opposite Answorth, on Kootenay Lake, in company with the company's general manager, S. S. Fowler, of Nelson.

B. A. Lasell, manager of the Bear Hydraulic Company, operating on Cunningham Creek, Cariboo, was in Victoria during November. He purposes shortly proceeding to New York to there confer with others interested in the company.

Ed. Dedolph, who lately resigned as superintendent of the Sullivan smelter, before leaving Marysville,

address and a gold watch.

engineer to the Dominion Copper Company, accompanied H. H. Melville, of New York, its

the company has been operating in the Boundary district

Albert I. Goodell has been appointed manager of the Sullivan Company's lead smelter at Marysville, East Kootenay, upon his retirement from the management of the Le Roi Mining Company's smelting works at Northport, Washington, U.S.A.

Robert Strachan, who was temporarily superintendent at the Crow's Nest Pass Coal Company's Michel colliery, after Mr. Simister's promotion, has been appointed superintendent of the company's Coal Creek mines, succeeding Andrew Colville there.

Wm. Gardner, of London, England, secretary of the Tye Copper Company, is in British Columbia temporarily in charge of the company's mining and smelting business on Vancouver Island pending the appointment of a successor to the late Clermont Livingstone as general manager for the company in the Province.

James D. Hurd assumed the duties of general manager of the Crow's Nest Pass Coal Company, with offices at Fernie, on November 16. His predecessor, G. G. S. Lindsey, has been appointed president of the company, with headquarters at Toronto, Ontario, in place of Hon. Senator Cox, who had been president for nine years.

John Hampson, of Nelson, has arranged to leave Canada for England on December 13. He expects to return next spring. Mr. Hampson was in charge of the Brown-Alaska Company's Mamie mine near Hadley, southeast Alaska, until the recent suspension of operations there.

Louis Katona, a Hungarian metallurgist, has been visiting mines and smelters in the Kootenay and Boundary districts. He came to Canada after having been similarly engaged in several European countries. He will spend some time in the United States and then proceed to Australia and New Zealand.

Capt. T. H. Trethewey, on the eve of his final retirement from the management of the La Plata mine, was entertained at dinner at Nelson on November 18 by a number of his intimate friends, who cordially wished him "God speed and success." He left Nelson for Port Arthur, Ontario, two days later.

W. J. Elmendorf, manager of the Arctic Chief Mining Company, in southern Yukon, returned to Whitehorse on November 18 from a trip to the Portland Canal district, whence he had been to examine the mineral claims of the Portland Canal Mining and Development Company of Duncans, B.C.

H. N. Galer, vice-president of the International Coal and Coke Company, was banqueted at Coleman, southwest Alberta, by the company's official staff on the occasion of his removing from Coleman to Spokane, Washington, U.S.A. Mr. Galer has been resident manager of the company for about two years.

The *American Mining Review*, of Los Angeles, California, U.S.A., lately published the following personal note: "A. Chester Beatty will, it is stated, resign his position on the Guggenheim engineering staff. It is rumoured that he may accept a position with the United States Smelting, Refining and Mining Company."

Charles Camsell, of the Geological Survey branch of the Dominion Department of Mines, read a paper lately before the Logan Club, Ottawa, on the "Ore Deposits of the Vicinity of Hedley, Similkameen." Mr. Camsell was engaged in geological survey work in the Similkameen during the field-work seasons of 1906 and 1907.

Among a number of newly elected members of the American Institute of Mining Engineers who lately accepted election was Lyndon K. Armstrong, mining engineer of Spokane, Washington, U.S.A. Mr. Armstrong formerly published a mining journal at Spokane. He is known to most mining men of the Kootenay and Boundary districts of British Columbia.

J. J. Fleutot, managing director of the West Canadian Collieries, Limited, has returned to Blairmore, Alberta,

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(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

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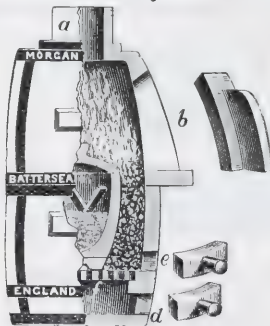
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NOTES AND COMMENTS.

A good specimen of a mine was found in the bed of Lake Arrow in Vancouver.

A shaft on the Orphan River, British Columbia, has been sunk to a depth of 400 ft.

In 1907, the Province Government granted 420,000 acres of land to the British Columbia Land Company, Ltd., for a period of 99 years.

During 1907 the principal export of minerals from British Columbia was in the form of coal and iron ore.

On and after January 1, 1908, the address of the The Canadian Mining Company, Limited, will be "Head Office, Montreal Building, 4th Floor, P.O. Box 665."

Work was carried on the ground at the mine at the time of the general shut-down in November.

An extension of facilities for the treatment of lead ore and concentrates at the Consolidated Company's smelter at Trail will be in a small degree completed this month and the extension to be put in place of part of the extension of the S. P. smelter in the Kootenai.

The District of Columbia has been found to be a good source of lead ore and concentrates. A number of excellent quality is being opened and preparations are being made to maintain a steady production of mineral ore.

It is understood that the Le Roi Mining Company will shortly be mining in the Kootenai district. The company has been made public, but it is known that the company is having difficulty in the Kootenai to reach the vein referred to.

During four weeks ended December 27 the production of coal at the collieries of the Crow's Nest Pass Coal Company totalled 84,282 tons (2,000 lb.). As there were in that period but 23 days on which coal was mined this gave an average production of 3,665 tons per day. The total production in 1907 was nearly 982,000 short tons gross. Reduced to tons of 2,240 lb. this gives an output for the year of 876,757 tons as compared with 720,449 tons in 1906. The 1907 production was disposed of as under, figures being approximate:

	Tons of 2,240 lb.
Manufactured into coke	322,000
Exported to United States	290,000
Sold in Canada	220,000
Used under collieries' boilers	44,000
Total	876,000

The coke manufactured totalled about 206,500 long tons, as against 189,385 tons in 1906.

Members of the Canadian Mining Institute will shortly elect officers for the ensuing year and members of the council for stated periods. Once again some Ontario members are endeavouring to carry out plans which many members resident in other provinces fear will, if these Ontario members gain their present ends, eventually lead to the disruption of the institute as a national, in contradistinction to a provincial, institution. So seriously is the present position regarded that the president now in office and four past presidents have jointly signed a circular letter to members submitting that "members, in voting for candidates for vacant offices, should see to it that the industries of the Dominion are adequately represented rather than that preponderance be given to any one industry or any one Province." Further, it is pointed out that a particular canvas "has been directed against two faithful and efficient officers of the institute, viz., the secretary, Mr. H. Mortimer Lamb, and the treasurer, Mr. J. Stevenson Brown." The MINING RECORD does not hold a brief for any candidate for office, but it is heartily in accord with the views of the gentlemen whose signatures are appended to the letter here referred to, that the best interests of the institute will be far more effectually conserved by re-electing the two executive officials named than in thrusting them aside in order to satisfy the ambitions of other men who may possibly be not so well suited for the particular offices these two have well and worthily filled. It would seem as if the western members of the institute have an important duty to perform—to assist the eastern members to preserve the national character of the institute, and this we think they can at the present juncture most effectively do by supporting only those candidates for offices and council who may be depended upon to continue the good work of the institute along similar lines to those heretofore successfully followed.

There were several incorrect statements included in Mr. H. Mortimer Lamb's article on "Mining in British Columbia," contributed to *Mines and Minerals*, of Scranton, Pennsylvania, U.S.A., and reprinted in last month's MINING RECORD, reference to which we purposely deferred until after we had verified information then in our possession, so that we might be the more positive in our expression of non-agreement with Mr. Lamb on these particular points. First, Mr. Lamb excepted the Slocan from those districts in which he said there were "signs of material activity and progress everywhere apparent." This did not do the Slocan justice by any means. Those who are familiar with the Slocan, which Mr. Lamb evidently is not, well know that in 1907 it made more material progress than in any other of several recent years. We need only mention here the Montezuma, Whitewater, Rambler-Cariboo, Ruth, Richmond-Eureka, Standard, Vancouver group, Hewitt, Lorna Doone, Arlington, and other mines that were active the greater part of the year, while there were literally scores of small properties upon which some work was done and many of which produced ore, some on a small scale and others in appreciably large quantity. Next, Mr. Lamb was duped into giving publicity to one or two of the well known fabrications of enemies of the Le Roi Mining Company. What authority had Mr. Lamb, we ask, for the assertion that "in order to keep the furnaces running the Le Roi ships (to its smelter at Northport) a great quantity of nearly valueless rock." If he can give any dependable evidence in support of this serious charge he should not hesitate to do so; if not he should publicly retract what we believe to be one of the falsehoods that certain persons, with set purpose of discrediting the Le Roi management and the Northport smelter from time to time circulate. One more statement we take strong exception to, viz., that the Le Roi No. 2 is in the West "the one notable exception in the long list of mismanaged British-owned properties." Did Mr. Lamb never hear of the Tyee Copper Company? Did he ever when editing the MINING RECORD give that management unstinted praise? Did it not then and does it not still deserve all the credit ever given to it in the West, and more too, for its enterprise, its persistence despite occasional discouragement in carrying on a thoroughly legitimate mining and smelting business, and making it a financial success? We agree that the management of the Le Roi No. 2 has been, and is, good, but there are others, and Mr. Lamb should know better than to assert there are not. If Mr. Lamb should again feel impelled to write on British Columbia mining matters we shall hope for the exercise of more care on his part. There are more than enough unreliable "penny-a-line" writers contributing to newspapers rubbish supposed to be British Columbia mining news, without his doing similarly, even in a small measure, to influential mining journals.

THE MINERAL PRODUCTION OF BRITISH COLUMBIA IN 1907.

(Continued from last Month)

FURTHER INFORMATION concerning the mineral production of British Columbia in 1907 is contained in a brief review of the several mining districts of the Province, this being a continuation of the article which appeared in last month's issue of the *MINING RECORD* under a similar heading to that printed above. The additional particulars, held over, follow:

PROGRESS AND PROSPECTS.

Concerning the chief developments of the year and the prospects of the mining industry of the Province for 1908, the following comments are made:

Cariboo.—The announced decision of the Guggenheims' companies not to proceed further with construction of their water supply system, which was undertaken with the object of bringing in a greatly increased supply of water for washing the enormous gold-gravel beds in Quesnel division on which J. B. Hobson had been working about ten years, has caused general disappointment throughout the district. The Guggenheims' engineers are stated to have reported unfavourably regarding average gold values obtained when testing the gravel, so expenditure on construction has been stopped. Total gold recovery from this property from 1897 to date is \$1,062,700. In the Cariboo division—the "district" includes three "divisions," viz., Cariboo, Quesnel and Omineca—hydraulic mining continues to give fairly satisfactory results on the whole, but deep-drifting has not yet proved successful. Ordinary placer mining operations in Omineca were unimportant.

Cassiar.—Atlin, Liard and Skeena are in this district. In Atlin gold dredging has been abandoned; placer mining by individuals has steadily decreased; hydraulic mining by the larger companies in 1907 resulted in a smaller recovery of gold than in 1906. In Liard division the Berry Creek Mining Company's results from hydraulic mining on Thibert Creek were much below expectations, slides of top dirt into the pits having prevented gravel washing during part of last season. In Skeena division, a few thousand tons of ore were shipped to the smelter at Hazelton, south-east Alaska, from the Outsiders group, on Portland Canal, and developments on two or three other properties are promising. Inland in this division, further prospecting was done in Telkwa, Bulkley and Babine sections, but production will not be practicable, neither of coal nor metalliferous minerals, until after the Grand Trunk Pacific railway shall have been constructed. Many prospectors have been attracted to the Queen Charlotte Islands, also in Skeena division, a Japanese company having opened up a large deposit of ore at Ikeda Bay and shipped thence to the Tyee Copper Company's smelter at Hazelton, about 700 tons, having a comparatively high value in copper and gold.

East Kootenay.—The U. S. Engineers and Surveyors have been the greater part of the last continuance of the Province for the year, also a portion of the silver. The Crow's Nest Pass Coal Company's output amounted to about 350,000 tons of coal, which, about 15,000 tons more, was shipped here of late. This company has made financial arrangements for facilities to considerably increase its output of coal and coke, for which markets are available. The Pacific Coal Company made much progress with the construction and equipment of its colliery near Honeydell in the Crow's Nest Pass. Several coal properties in the Upper Elk River district were prospected and preliminary surveys were made of routes for proposed railways to provide transportation facilities. Placer gold mining operations in East Kootenay were again small. The installation of an Elmore Vacuum Oil Concentration plant at the Giant mine, Northeast Kootenay, is in hand.

West Kootenay.—Ainsworth camp had several mines at work; some 1,100 tons of silver-lead ore were shipped and important development work was done. At the Blue Bell, across Kootenay Lake from Ainsworth, development was discontinued last summer pending completion of the 200-ton concentrating mill in course of erection, sufficient ore having been made accessible to run the mill for about five years. On the south fork of Kaslo Creek mining was continued and a concentrator operated.

In the Sloean, at Whitewater there was milled a lot of ore from which silver, lead, and zinc concentrates were produced. The Rambler-Cariboo resumed production after completion of the most extensive development work yet done in the district, and the outlook is now favourable for good results. No information has yet been received relative to progress at mines around Sandon. Another stage has been reached in the Sloean Star extra-lateral rights litigation, the Full Court having reversed the previous Supreme Court decision, the latest judgment being against the Byron N. White Company, defendants, but an appeal is to be taken to the Supreme Court of Canada. Around Silverton, the Hewitt, Vancouver group, and Standard each made good progress both in development and production. In Sloean City division, several mines were active, notably the Arlington and Ottawa, while the Westmont, a new property, gives much promise.

Of the mines in Vancouver the Fairchild made the best record, its output of silver and lead having been appreciably large. The Silver King (copper-silver), Eureka and Queen Victoria (copper) were also shippers in quantity. Of the gold-quartz mines, the Granite (copper and gold), the Silver King (copper-silver), Queen, Second Relief and Kootenay (copper), the U. S. (copper), the U. S. (copper), but the Ymir was again disappointing. The Hunter V. sent out a considerable tonnage of silver-bearing lime ore.

Refractory mining was a production place, and the

that of 1906—something like 280,000 tons, practically all from the Le Roi, Centre Star-War Eagle group, and Le Roi No. 2. Substantial improvements and additions to the machinery and plant of the Centre Star-War Eagle mines were made by the Consolidated Mining and Smelting Company of Canada. There was no interruption to operations in this camp, the miners having voluntarily accepted lower wages after the slump in copper prices.

In Revelstoke and Lardeau sections mining was not active. The largest producers were the Eva (gold) at Camborne, and Silver Cup (silver-lead) in Ferguson camp. The Broadview, near Ferguson, was extensively developed, but did not ship any ore. The Silver Dollar, near Camborne, completed a small stamp mill and commenced crushing ore. Placer mining for gold was continued in the Big Bend country north of Revelstoke, but the total recovery there was not large.

Lilloet.—Little worth noting was done in this district. Placer gold mining by individual miners has dwindled to small proportions, and dredge mining has been discontinued owing to unsuitability of the dredges used for the work of dredging in the Fraser River.

Boundary.—Published figures give a production of about 1,148,000 tons of ore, contributed in the following approximate proportions: Granby Company's mines, 614,000 tons; British Columbia Copper Company's mines, 243,000 tons; Dominion Copper Company's mines, 156,000 tons; Consolidated M. and S. Company's Snowshoe mine, 135,000 tons. There was little production in November and none in December, the mines having been closed on account of the low price of copper and high labour and materials costs. Although not assigned as one of the reasons for the suspension of work, there is little doubt the general inefficiency and aggressive unreasonableness of many of the employees was another factor taken into account when the big companies decided to suspend operations for a time. Developments at the several larger mines show that there continues to be an abundance of ore available, consequently preparations for still greater production were either in progress or authorized when the shut-down was decided upon. The small high-grade mines of the district have not been up to expectations of earlier years. Work has been stopped for the winter in Franklin camp, north fork of Kettle River, where large bodies of ore have been located. Up the west fork of Kettle River small shipments of high-grade silver-gold ore were made, but production will remain small until after railway transportation shall have been provided. At Camp McKinney, the old Cariboo-McKinney gold-quartz mine was reopened but was not worked for many weeks.

Yale. The Stemwinder mine at Fairview, Okanagan, late in the year was reported to have made an important strike of gold-quartz ore at its 500-ft. level. In Hedley camp, lower Similkameen, operations were continued at the Nickel Plate gold mine, but no par-

ticulars of results have been received. In 1906 production was about 35,000 tons of ore running about \$12 per ton.

Other Similkameen operations were as follows: At Princeton the development of the coal measures of the Vermilion Forks Company was continued and a small production of coal made. No noteworthy progress was made on Copper Mountain claims, neither as to work nor endeavours to sell them. On Bear Creek, in the Tulameen section, developments were encouraging at both the group of claims under development by a Vancouver company, and those under bond to the Granby Company interests. Some interest was shown in the old placer gold creeks of the district, and there was talk of fresh efforts to produce platinum.

In Nicola Valley coal mining made a gratifying advance. At the Nicola Valley Coal & Coke Company's property two seams were opened, a plant installed, railway connection established, and the shipment of coal commenced. The Diamond Vale Company also made progress with the development of its property and installation of a plant, and encountered coal in one of its shafts.

Little calling for notice occurred in the several other interior divisions—Yale, Ashcroft, Kamloops and Vernon.

Coast.—At the Britannia Copper Syndicate's Britannia mine on Howe Sound much development and diamond drill work was done, with generally encouraging results. The mine camp was remodelled, a saw mill put in, a new 25-drill air compressor installed (driven by a Pelton water wheel and supplying the mine with compressed air through 18,000 ft. of 8-in. pipe), and the concentrating mill rearranged, the milling practice having been changed from a fine- to a coarse-crushing plant with a gradual reduction on intermediate jigging operations on sized products.

Off the mainland the principal work was done at Mt. Sicker, Vancouver Island, where the Tyee mine continued work all the year, shipping its ore to Ladysmith. The Lenora, in the same camp, was reopened after having been unworked for several years, and shipped ore to Ladysmith until the low price of copper considerably reduced profits, when shipping ceased for the time. The Richard III, adjoining the Tyee, shipped between 3,000 and 4,000 tons of ore, also to Ladysmith. Claims were worked at Koksilah Mountain, Sooke, and Bowen and Valdez Islands, and from all these places more or less ore was sent to the Tyee Copper Company's smelter for treatment. On the west coast of Vancouver Island, the Indian Chief group at Sidney Inlet was extensively prospected by a Seattle, Washington, company, with encouraging results in quantity of ore of good grade uncovered; while at Quatsino Sound, the June group had the attention of some Pittsburg men, who are putting in half-a-dozen miles of railway between the property and tide water.

General.—Progress on the whole was substantial,

through the various valleys in the past, and have been established in some of the better localities. In the year 1891 eight mining companies, owned either individually or in partnership, were operating, and aggregating about \$2,000,000, while some of the partnerships also made substantial profits. The amounts were not published. These were reported as a revival of mining in Ainsworth and Slocan districts, with numerous small mines either already shipping silver and lead ores or preparing to do so. The year's loss as compared with 1890, of nearly \$2,000,000 in value of metalliferous mineral production was more than compensated for in the increase in coal and coke. The prospects for the latter are decidedly favourable, with a very active demand, and new properties being opened on Vancouver Island, in Nicola Valley, and in the Crow's Nest Pass district. While both zinc and iron have remained practically unproductive, efforts are being made to utilize these mineral resources. A plant is being established at Nelson for the electric reduction of zinc ore, but its commercial success remains to be demonstrated. Under instructions from the Dominion department of mines, Einar Lindeman, a Swedish iron expert, spent six months examining iron ore occurrences on Vancouver and Texada Islands. Of many showings visited he pronounced four promising—three on Vancouver Island and one on Texada. Quality of ore is considered satisfactory, but extent remains to be proved. Mr. Lindeman's report will be awaited with much interest on this coast.

MINING INFORMATION FOR SCHOOLS.

ACCURATE INFORMATION regarding mineral resources of British Columbia is not, so we are informed, available to the pupils of the public schools of the Province through the medium of the school readers in use in them. While we have not examined the books to ascertain what information on this subject they contain, we do know that some time since an application was made to the editor of this journal by a public school teacher for some data concerning mining in this Province required for the enlightenment of certain pupils, and later it came to our notice that the information thus supplied was passed on to several other teachers, who were glad to have it in easily accessible form. We conclude, therefore, that the subject matter of the following letter, contributed to the *Canadian Mining Journal* by Mr. J. B. Tyrrell, a well known mining engineer resident in Toronto, Ontario, may well have the careful attention of the educational authorities of this Province, with a view to their adopting a similar course in regard to British Columbia to that suggested for Ontario. Mr. Tyrrell wrote:

"Probably within a short time the Government of Ontario will revise its readers in use in the public schools, or possibly it may prepare a new set of readers altogether. In either event nothing could be more appropriate than that a goodly number of articles should be included in them descriptive of

the various and mineral industries of Canada, with accounts of their discoveries, growth and progress up to their present condition.

"An account of the discovery of nickel at Sudbury and the development of this nickel industry up to its present enormous proportions would make a most interesting and instructive story, while the history of silver lead would be equally so were told in the Province. Relations of incidents in the lives of prospectors who have traversed the woods and on foot with packs on their backs, through the northern forest would be far more entertaining to children than the trivial and mendacious stories of travel and adventure which are now current among the people, and especially among the children.

"The value of a large part of Canada must ultimately depend not on its agriculture, fisheries or forest resources, but on its production of mineral wealth; so that mining is and must always be in increasing measure an industry of the first importance to us.

"In no way can the people of the country be educated to appreciate the importance of the mining industry better than by informing them of it from their very earliest years through the medium of the school readers. The children might then grow up ambitious to emulate the exploits of some of our successful prospectors, who have travelled through the wilderness with the constant aim of finding valuable deposits of ore, instead of having their thoughts foolishly centred on bears and wolves with the loveable attributes of the theatrical villain and the appearance of the woolly denizens of the toy shops.

"Accurate information about our own mines and mining possibilities and about the hazards of the search for ore, so imparted to the children through the school readers, would form a basis for a sound knowledge of Canadian mining conditions, and of the vast importance of the mining industry to the general progress and welfare of the Dominion, and at the same time would fortify them against the blandishments of the men who endeavour to get their money on the fraudulent pretext that they are investing it for them in mining enterprises.

"I trust that not only Ontario, but all the other provinces in the Dominion, will see to it that the children are taught something about the mines and mining possibilities of Canada, and to that end will incorporate in their school readers, interesting and accurate information about the mineral deposits."

The *Canadian Journal of Professional Engineering* has published a paper by Mr. J. B. Tyrrell, a well known mining engineer resident in Toronto, Ontario, may well have the careful attention of the educational authorities of this Province, with a view to their adopting a similar course in regard to British Columbia to that suggested for Ontario. Mr. Tyrrell wrote:

The Elwood Tinworkers Gold Mining Company, which has been operating the Silver Dollar claim, situated near Camberne, northern Lardeau, is stated to be in financial straits, and that liquidation is to take place.

LEAD MINING IN BRITISH COLUMBIA.

Particulars of Operations in 1907.

LEAD MINING in British Columbia in 1907 is dealt with in the following review, which was prepared for the *Nelson Daily News* by a contributor well informed on this subject and consequently qualified to give particulars of the progress made in this branch of metalliferous mining during the year under notice.

PRODUCTION OF LEAD IN 1907.

With moderate estimate for December production, the output for the year will be:

	Lb.
Smelted by Hall M. & S. Co.	6,329,248
Smelted by Consolidated M. & S. Co. . .	21,686,078
All other smelters	10,631,036
Exported in ore to U. S. and Europe . .	7,900,990

Total lb. 46,547,352

This is equal to 23,273½ tons.

The production in 1906 was 26,389 tons, being somewhat more than 3,000 tons in excess of the estimate for the present year.

The chief shipping mines were: St. Eugene, Sullivan, La Plata, North Star, Silver Cup (Ferguson Mines, Ltd.), Whitewater, Whitewater Deep, Rambler-Cariboo, Lone Bachelor, Lightning Peak, Lorna Doone, Last Chance, Richmond, Spokane, Trinket, Vancouver, Arlington (Erie), Arlington (Slocan), Colonial, Sunset, Idaho, American Boy, Beatrice, California, Emerald, Maestro, Payne, Black Diamond, Montezuma, Queen Bess, Standard, Reco, Tecumseh, Adams Group, Emily Edith, Ferguson, Gallagher, Mountain Con., Mammoth group, Flint, Province, Hartney group, Libby, Wakefield.

The price of lead in the London market ruled exceptionally high, in the neighbourhood of £20, for ten months of the year, reaching a maximum of £21 5s. on June 14. In November it fell rapidly and on December 16 reached a minimum of £13, a fall since followed by a reaction to £14 12s. 6d. per long ton.

The Dominion bounty was quiescent from April 25, 1906, to December 2, 1907, when fractional payments began to be made and these at times since have reached 64 cents per 100 lb., the bounty operating practically as a guarantee that the price of lead to the producer will not fall below £16 per long ton.

With present range of prices it is probable that bounty disbursements for the seven months remaining of the period will aggregate \$100,000 to \$150,000.

The lead stacks of the Hall Mines smelter at Nelson were blown out on September 16, and are still idle.

About 400 tons of lead, practically the amount produced in excess of the requirements for Canadian consumption, has been exported in ore. The bulk of this has gone to Europe.

With the recent marked decline of London prices, exports have ceased.

The price of silver has steadily fallen throughout the year, a recent quotation having been 52½ cents. As lead is but a by-product of high-grade mines, including most of those in the Slocan and Lardeau, the price of silver is the decisive factor in the question of their operation.

The decision of the United States board of appraisers to whom was appealed the ruling of the secretary of the treasury in regard to duty on zinc ores, which was that "Silicate and carbonate of zinc shall henceforth be classified as calamine, and may be imported free into the United States," is still nominally in force, but an appeal having been taken therefrom, the deposit of duty, subject to final decision of the point involved, is required by the United States customs authorities, and this circumstance operates to shut off nearly altogether such shipments for the time being.

The smelter of the Canadian Metal Company at Frank has not been in operation within a year.

A plant for the treatment of zinc ores by an electrical process is under construction at Nelson by a company represented by Robert Irving and Frederick T. Snyder, M.E. The successful operation of this plant will be of great value to the mining districts tributary to Kootenay Lake, in which many mines are found, incapable of profitable working except by some system under which the value of zinc contents can be recovered.

SOME LEAD-PRODUCING MINES.

Aside from the St. Eugene and the Sullivan mines, which are apparently capable of keeping up their present high rate of production for many years to come, the mines that have attracted some attention during the year as silver-lead producers are the La Plata, under the management of Bruce White; the Whitewater and Whitewater Deep, under the management of John L. Retallack; the Ferguson mines, George Alexander, manager, and the Rambler-Cariboo, captained by W. E. Zwicky. In the last-mentioned the workings connecting the long tunnel with the old workings above were completed early in the year, and the mine is now reported to be in fine shape for heavy shipments when the price of metals shall be favourable.

The historic Blue Bell on, Kootenay Lake, has undergone, at the hands of S. S. Fowler, thorough rejuvenation and is understood to be prepared for the production of a large tonnage of silver-lead and zinc ores.

The Vancouver mine, in Silverton camp, now under lease to the Le Roi No. 2 Company, has been a heavy shipper of high-grade ore.

The old Montezuma mine and mill, on the south fork of Kaslo Creek, has been rehabilitated and operated during the year by Henry Geigerich and has made considerable shipments of concentrates of good grade.

The Lucky Jim, at Bear Lake, has had much de-

development work done in it, and is more than one the better mine mine of the Dominion.

OTHER PERTINENT MATTERS

Development work on the Wagner prospect, located on Hall Creek, Duncan River, carried on last summer, has uncovered an immense deposit of ore of excellent grade.

An urgent appeal has been made to the Dominion and Provincial governments for expediting upon the river and road connections necessary for the marketing of the ore.

The question of the rates of wages paid for various lines of work in the St. Eugene mine having been under agitation for some time, steps were taken during the summer to bring the matter before a conciliation board, under the provisions of the Lemieux Act. The board, consisting of P. E. Wilson, judge of the county court; J. A. Harvey, Cranbrook, and S. S. Taylor, Nelson, went very fully into the case and made a report thereon.

The recommendations are not enforceable by any legal means, but the report is the result of so much investigation and the unanimous finding of a body so thoroughly competent, that any attempt to better it would be hopeless.

It may be hoped that for a long time the rates suggested will be accepted by all parties, with the result that the labour troubles that have done so much to disfigure our annual summaries of results accomplished in our mining camps and smelter towns will disappear.

EXTENSION OF LEAD BOUNTY ASKED FOR.

At a meeting of the Nelson board of trade, held on December 12, among other important business considered was the subject of extension of the period during which payment shall be made by the Dominion Government of the bounty on lead produced in Canada. Louis Pratt, of Sandon, submitted for the endorsement of the meeting the following memorial to Hon. Wm. Templeman, Dominion minister of mines, this having already been numerously signed by mine owners, managers and others actively interested in the lead mining industry:

"We, the undersigned, who have been producers of lead ore since the inception of the Lead Bounty Act, respectfully address you, as representing the mining industry of the Dominion, and request your favourable consideration of the following memorial, and further, that you favour us by bringing the same to the attention of the Right Honourable the Premier and your colleagues of the cabinet:

"1. That said lead bounty has, by insuring a stable minimum price, been most effective and beneficial to the lead mining industry, with it, too, the smelting and manufacturing industries, and consequently to the general commerce of the Dominion.

"2. That such results have been produced by a relatively small expenditure, as was anticipated, and as was represented when the original request for consideration was made to the Government. Out of \$2,500,000 originally voted to be expended in the

period of bounty introduction, \$1,000,000 has been expended to date. This is a small sum for the purpose of the bounty.

"That because of the high cost of lead ore and the consequent difficulty of the United States government to obtain a sufficient supply of lead ore, the government of the United States has imposed a prohibitory duty on our zinc ores, a product of our lead-bearing veins, thus depriving us of a source of revenue and of the fact that the lead consuming capacity of Canada has not increased proportionately to our output, since the inception of the bounty, we shall at the expiration of said bounty period, be still unable to rely on a stable minimum price for our lead, sufficient to justify its production in the form of ore and the large expenditures on exploration and development work necessary to maintain our mines and with them the entire lead industry of Canada.

"4. That without such a stable minimum price we cannot produce our ores, during periods of low prices in the world's market, which governs the market of Canada and with such intermittent production the inducement to expend the necessary large sums in exploration and development will cease to exist, consequently the present ore reserves in our mines will be exhausted and with them the lead mining industry.

"5. That with the United States tariff and the consuming capacity of Canada as at present, the necessary stable minimum price can only be assured by a continuance of the present lead bounty or by an extraordinary increase in the existing Canadian tariff on lead and its products.

"The undersigned therefore respectfully request that the Lead Bounty Act be extended for a further period of five years, with an expenditure not to exceed \$500,000 in any one year."

T. G. Procter moved that a resolution, carefully worded, be adopted, embodying the views of the memorial.

J. J. Campbell seconded, asking, however, that sight should not be lost of the fact that a tariff on lead would be the more logical way of treating the matter.

This passing, Messrs. T. G. Procter, J. J. Campbell and L. Pratt drew up the following resolution to be presented at the annual convention of the Associated Farmers of the Province of British Columbia for further endorsement:

"That this board approves of the petition which has been signed by all the principal lead producers of this section, asking the Dominion Government to extend the lead bounty for another period of five years after the expiration of the present term, recognizing that the attitude of the government is more favourable to this method of relief than to the readjustment of the tariff, which this board has always felt and still maintains would be the most effective assistance to placing both the local lead mining and smelting industries upon a firm basis.

"That this board recognizes that with the present condition of the markets there is danger of a number of producers being compelled to close down, with a disastrous effect upon the commercial interests of this section of the country, and that a copy of this resolution be forwarded to W. A. Galliher, M.P., with a request that it be communicated to the proper authorities and that he use his endeavours to obtain the granting of the petition, and that a copy of this resolution be sent to the boards of trade belonging to the associated boards of trade, with a request for their co-operation, and that our delegates be instructed to endeavour to secure the passage of a similar resolution at the annual convention of that body."

CRANBROOK BOARD OF TRADE AND LEAD BOUNTY.

On December 16 the board of trade of the town of Cranbrook, East Kootenay, also unanimously adopted a resolution requesting the Dominion Government to extend for a further period of five years the operation of the Lead Bounty Act. In support of this resolution the following memorandum of reasons for such extension was forwarded to Ottawa:

"The smelting works of the Sullivan Group Mining Company at Marysville, on the North Star branch of the Canadian Pacific Railway (Crow's Nest Pass branch), 14 miles from Cranbrook, have been completed, equipped and put in operation within the last three years. Prior to that a large expenditure had been made on smelting works at that point, but the work was discontinued and the project practically abandoned. The Sullivan mine, the property of the company, is the producer of a low grade ore, difficult to treat on account of excessive sulphur and zinc contents. At the present moment there is commonly reported to be in sight in the mine 20 years' supply of ore for a smelter of the capacity of 100 tons per day. Under the encouragement afforded by the bounty the smelter was completed and has been operated so far, and through the introduction of the Huntington-Heberlein process, the first to be installed in Canada, a metallurgical success has been made of the treatment of this ore. Two small towns, Marysville and Kimberley, each with a population of several hundreds, have sprung up in connection with mine and smelter. Great progress has also been made in the demonstration of the capacity of the surrounding land for agricultural purposes, and a considerable population, ranchers and farmers, is growing up around these works. Marysville, moreover, is at the portal of the St. Mary's Valley, a district, believed to be of great promise as a mineral producer, and the continued operation of the mine, smelter and branch railway is essential to the development of this new district. The Sullivan Company lately have had the benefit of the extraordinarily high prices prevailing in the world's market for lead, but these prices have suddenly fallen to a low level, with the prospect that low prices may prevail for some years. We of course have reason to fear that the business that has been carried on lately on the basis of about

£20 for lead will be impracticable with lead at £12 or less.

"The town of Moyie, at which the St. Eugene mine is situated, is but 20 miles from Cranbrook, and has supported, since the bounty period began, a thriving population of several hundreds. We understand that the grade of ore in the St. Eugene mine is no longer what it has been in the past and even that property is liable to be seriously handicapped if the bounty now ceases.

"We recognize that bounty provisions are in their nature temporary and terminable, but in view of the fact that the Government have been fortunate in the occurrence of a period of very high prices for lead, thereby cutting down the expenditure they had contemplated in the payment of bounty to about one-third or one-quarter of the amount estimated we think that it could well afford to make, and would be justified in making, the extension of the period now asked for.

"The towns of Marysville, Kimberley and Moyie are important tributaries of Cranbrook; the country is new and development has but begun. Should anything occur to bring about the suspension of the Sullivan or St. Eugene mines a great setback would be given to our three great staple industries—mining, lumbering and agriculture.

"We strongly urge that the request contained in our resolution be complied with.

"C. H. DUNBAR,
"Secretary Cranbrook Board of Trade."

Announcement has been made that the Canadian-American Coal and Coke Company is making preparation to build 240 coke ovens, put in a coal-washing plant of 1,000 tons daily capacity, and substitute a compressed air haulage system for the rope and horse system it now employs. The installation of an electric lighting plant and other improvements are also included in the comprehensive plans formulated by General Manager S. M. Moore. The company has been operating its coal mine at Frank, Alberta, about seven years. Latterly its output has been up to 1,000 tons a day, and an increase to 1,500 tons daily within a year is confidently expected.

It is proposed that a party of from 50 to 100 university students, chiefly those taking a scientific course in the colleges of Great Britain, shall make an eight weeks' tour of Canada. The intention is that the students shall visit numerous industrial plants in various parts of the Dominion so as to give them an adequate idea of the industries established and in operation. Lord Strathcona, high commissioner for Canada in London, is president of the committee having this matter in hand, and Sir Wilfred Laurier, prime minister of Canada, one of the patrons. The secretary, a young Canadian engineer resident in London, was in British Columbia lately in connection with this proposal.

Canada was installed. The engine of this hoist is a double reversible Nordberg Corliss, having steam cylinders 28 in. in diameter and 60 in. stroke. The cylindrical drums are 10 ft. in diameter by 66 in. face, turned for 3,000 ft. of $1\frac{1}{4}$ in. rope and capable of lifting a total unbalanced load of 20,000 lb., including rope, from a 70-deg. incline shaft at a speed of 2,000 ft. per min. Friction clutches and brake for each drum are operated by steam power.

The hoisted ore is passed through the Farrell ore crusher, classified into coarse and fine, and conveyed by link belts into the sampling bins. On the way the ore is hand sorted, during which process about 15 per cent. waste is eliminated. With this powerful engine in operation and the scheme of development completed, the Centre Star company was able, about the middle of the year, to begin to ship to its smelter on a larger basis. Daily 600 to 700 tons can be passed through this machinery, and this capacity can be increased. Unfortunately, hardly had the company finished its long and expensive work, when metal prices began to tumble and there no longer existed the same incentive to heavy shipments. However, the total output of the Centre Star is particularly good, considering the conditions.

The third important mine in the Rossland camp is the Le Roi No. 2. Now, whereas, in the Le Roi and Centre Star as depth has been gained copper values have decreased and the gold in the ore is between 0.33 and 0.50 oz. per ton, the Le Roi No. 2 has kept its values, both copper and gold, although lying contiguous to the properties named, separated merely by a dyke. Generally speaking, the ore bodies in the Le Roi No. 2 are more irregular and smaller than those in the properties already mentioned, but, at the same time, their values have been higher. In connection with the Le Roi No. 2 is a mill originally planned for the reduction of ore by means of water and oil, but which is now used with water only. The great reduction in smelter charges at Trail, which have decreased since its inception from \$13 and \$14 a ton to \$3.50, have rendered the necessity of milling less pressing. At the present time the Le Roi No. 2 is considered about the best paying property in the camp.

But in noting the progress made by the three principal mines in the camp, the whole of Rossland has by no means been covered. As the shipping list will show, there have been other mines which have sent shipments of ore to the Trail smelter. Had copper retained its values of the earlier portion of the year, it is undoubted that there would have been a far larger aggregate tonnage of ore shipped from such properties and far more development work done than has proved to be the case. The shipments made, therefore, must be regarded as trial lots, and if satisfactory returns had continued to be received, there would have been justification for more serious work.

It is noteworthy that the workings of the Centre Star have now reached 2,000 ft. below the surface; that is to say, they are getting down to the level of

the Columbia River at Trail. It has been found that from the surface down there has been, generally speaking, a lessening in the value of the ore, although from time to time in unexpected directions richer shoots have been met with, notably in the cases of the War Eagle, Centre Star and Le Roi last summer. It is, however, the theory of experts and geologists that below this level will be found a zone of secondary enrichment. Hence the development below this 2,000-ft. level, which must shortly take place in these mines, will be watched with great interest.

TRAIL.

It will hardly be necessary to do more here than note the principal features in the progress made during the past year at the Consolidated Company's smelting works at Trail.

To the copper side of the works the two chief shippers are the Centre Star of Rossland and the Snowshoe of the Boundary, although the smaller quantities of ore coming from the Le Roi No. 2 are of some value to the smelter. Economical reduction can only be carried on if the supply of ore, flux, and fuel is large and continuous. Here the smelter has been greatly handicapped throughout the year. First, in the defection of the Le Roi at a period when the development of the Centre Star had not been completed. Then followed difficulty as to coke, for months the smelter running with but a day or two's supply of fuel ahead. Later came the shut-down in the Boundary, losing to the works the ore shipments from the Snowshoe.

On the lead side, matters have been somewhat better, although there is not a property in the whole of the Slocan which to-day would guarantee, week in and week out, for a year or two in advance, a continuous supply of ore. Yet without such a supply it is impossible for a smelter to be run economically. Hence it is not surprising that the Trail smelter, not satisfied with its holdings in East Kootenay, has been opening up another property in the Slocan, the Richmond-Eureka.

The cost of reduction has been greatly lessened by improvements and extending of the Huntington-Heberlein ore roasting and converting process.

THE SLOCAN.

That which immediately strikes the observer looking at the history of mining in the silver-lead districts during 1907 is the rise of Silverton to importance. This has been mainly due to the great improvements undertaken and now being pushed to completion upon the Vancouver and Hewitt mines.

The Vancouver was taken in hand by the Le Roi No. 2 of Rossland. The development of the property at that time had not been extensive. Then it had no mill, so the Wakefield mill was leased for a period ending on March 1, next. A system of development was started and a section of the vein thoroughly prospected until the management are now in a position to declare that undoubtedly they have a mine and are justified in building a mill for themselves. The Vancouver is a silver-lead-zinc mine. It had

been shipping its lead concentrates to Trail, allowing its zinc concentrates to accumulate until the end of the year, when quite recently a shipment of the latter was made to Antwerp, Europe. Development has been carried on down to the fourth level, but the ground below and on the other sections of the vein has not been opened up. There is, though, no reason to doubt that the conditions which have obtained in this section of the lodes between the first and fourth levels will continue downwards and in extension of the strikes. The Vancouver mine covers a group of claims through which the veins run for some distance, and not only has this property a large quantity of ore blocked out, but as well a large extent of similar ground to prospect. Arrangements are now being made to obtain the necessary capital to operate this mine upon the larger scale justified by the results of the work done.

Next to the Vancouver, in the same camp, is the Hewitt. This property was developed by M. S. Davys. The results of his work were so satisfactory that the Hewitt and the adjacent properties have been taken up by a New York syndicate and a scheme of development has been pushed during the latter portion of the year. There is a large tonnage of ore blocked out between the sixth and first levels, enough to run the mill for several years. An aerial tramway has been built, a mile long, from No. 6 tunnel to the mill, with a subsidiary tramway from the sixth to the third level. It is expected the property will be in active shipping operation by about the end of March.

On the hill between Silverton and the old camp of Sandon is situated the Richmond-Eureka, a property now being developed by the Consolidated Company. Its shipments during the past year have not been considerable, for the Consolidated Company, pursuing the plan which it has carried out in connection with all its other properties, has first gone in for development before attempting to ship ore largely. This scheme of development, however, is now nearly finished. A large quantity of ore has been blocked out, and a tramway is being installed and will be completed within the next month or two, so that in the spring there should be considerable shipments to the Trail smelter.

The work upon the Vancouver, the Hewitt, and the Richmond-Eureka is something more or less new in the history of the Slovan. Usually the work done has been the taking of the mine lead by lead, level by level, stoping out the ore therein found, paying out the profits as accruing, and leaving the development more or less to take care of itself. This has led to disaster in the past. There are to-day in the Slovan mines which have paid large dividends in the past, such as the Payne, which is now not in a position to ship. Its narrow leads have been all worked out. Before anything else can be done, expensive development is necessary, and there are usually no funds available to do such work, especially in view of the fact that the fluctuations in the lead market are great and the demand for lead in Canada, although in-

creasing, is on at all equal to the supply. Furthermore, it has been the case almost invariably in the Slovan, especially in the shale and slate belt, as distinguished from the granite belt which runs from Sooty Lake to the south-west of the west arm of Kootenay Lake, that as depth has been gained, zinc percentages have supplanted those of lead. With little market for zinc, and with a penalty at the lead smelters for that product, it is not to be wondered at that, despite the payment of a bounty in lead, a bounty running for a period which cannot be counted for permanency in mining, there has been little incentive to the development of the Slovan silver-lead-zinc mines on a scale proportionate to that obtaining in Rossland and the Boundary. In those camps development precedes stoping. In the Slovan camps it has always lagged behind. It, therefore, now takes more capital to develop Slovan properties. The year 1907 will hereafter be remembered as the point of departure for a more scientific system of mining and the inauguration of such a system will be known as connected with the Hewitt and the Richmond-Eureka. In these properties it is not a case of one level being developed and then stoped out; but all of them have ore developed in advance to keep the mills running from one year to three or four years. This has been an expenditure on capital account to a very large extent, but the inaugurators of the scheme are convinced that their outlay is more than justified by results obtained. During the year 1908 the results of this new move in the Slovan will be successful, and there is no doubt but that this excellent example will be followed by a number of smaller properties. There are to-day shipping in the Slovan and East Kootenay no less than 109 silver-lead-zinc properties. The majority of these are small shipments. Some owners do little more than what would be considered assessment work each year, taking out a carload or two of fairly good ore, and then shutting down. Other shipments have been in the nature of trials. Again, in yet other cases, the shipments represent the work of lessees. In some cases leasing has led to more development and the discovery of new ore bodies, but in the majority it has been the taking out of ore in pockets and places where left unstoped by the original companies because of the impossibility of commercially extracting it at a profit. This is easily explicable. Most stoping is done by square sets or stulls and most drifts and crosscuts are apertures of more or less standard dimensions. Men leasing upon their own account will take risks which they could not do if working for others, but with loose rock to remove in development work and scant timbering for shafts, pits, a tunnel, etc., often make a profit where a company will find it impossible to do so.

There are in the vicinity of the three mines above mentioned several others of which more may be heard in the time to come. There is, for example, the Westmont on the shore of Kootenay Lake, not far from Sooty Lake. From this property presumably rich ore was taken in the early summer. It is

now a matter of capital and development to prove its capabilities. There is, again, the Canadian group, worked by Brandon Bros. of Silverton, upon which considerable development has been done during the year and from which there has been some shipping.

Another property of note in this district is the Mountain Boomer, which is included in the Vancouver group. A long tunnel is being driven here for the Vancouver vein. Though there is little tangible as yet, still from the surface indication and other considerations this property is supposed to be one of the most valuable of the whole group.

A property of which very little is heard is the Standard, which is being worked by George H. Aylard, but which is the property of John A. Finch, of Finch & Campbell, Spokane. Some shipments have been made during the year, but there has been far more development work done in proportion. In fact, so much is this the case that it is commonly rumored that the Standard has at least \$1,000,000 worth of ore in sight.

On the Arlington and the Ottawa much work has been done all summer, but mostly in the nature of prospecting. Extensive diamond-drill work has been done upon both properties.

The Buffalo, which lies next to the Wakefield, has been working all summer. The work done principally is that of development, in which many nice bunches of good ore have been encountered.

The Adams Group, between Silverton and Sandon, has been worked by Brandon Bros., in connection with the Canadian group, and fair results are said to have been attained.

A property not at first sight in connection with any of these, is the La Plata. The connection is merely justified because it is in the same granite belt extending across the country, which has already been alluded to. The La Plata has been one of the largest shippers for the past year and considerable development work has been done. The mine is essentially a low grade one and depends more or less upon the prices of lead and silver for its continued operation. So far its chief products have been lead and silver, the zinc being more or less a neglected factor, not amounting, as a rule, in its concentrates to more than the percentage allowed without penalty by the lead smelters. The La Plata is situated high above sea level. It has two distinct veins running parallel and close to each other, which have been opened up for a couple of miles, taking in all the drift work. So far these have proved continuous and payable, worked as they have been on the first to the fifth level. What is said to be one of the best concentrating mills in the Slovan is in connection with the property. The drawback to the mine has been the distance from transportation, there being 10 miles of wagon road between the mill and the lake shore. At the present time the mine is closed down, but it is expected that it will be reopened within the next few weeks.

SANDON.

Owing to litigation and to causes above alluded to,

the work in Sandon camp during the past year has not been phenomenal. The Payne mine, formerly one of the most noteworthy in the district, is practically at a standstill. The ore in its upper levels has nearly all been taken out and before this property can be placed upon a good basis it is necessary that a scheme of development upon the lower levels be entered upon. This will prove expensive. Senator Forget, of Montreal, recently acquired a large interest in this property, and it is understood the development work will be pushed some time in the future. As there is every reason to believe that the values continue with depth, a future may lie before the Payne mine.

Nearer to New Denver, the Lone Bachelor has been worked on lease during the summer with very fair results. That lease has now been surrendered, but the ultimate intentions of the owners are not known.

From such properties as the Queen Bess, Hartney, and many another of the old timers, shipments have been made, but the general work done has not been large. George F. Ransom has recently been working on the Slovan Sovereign, and it is understood with good results, some nice silver-lead ore having been disclosed.

The principal property working in this section of country has been the Whitewater, under lease to local men. The mill has been running at the rate of 500 tons a week for the greater part of the summer, but has recently been closed down to one-half of that capacity, owing to the slump in prices of silver and lead. During the year it has shipped some zinc to the United States and something like 3,000 tons of concentrates, including output of both the Whitewater and Whitewater Deep, to the Trail smelter. Nearer Kaslo the Lucky Jim has been a shipper of zinc.

LARDEAU.

One of the principal producers of the Lardeau has been the Ferguson Mines (Silver Cup-Nettie L.) but work has been performed upon the Mammoth, Eva and others about Camborne. The Silver Dollar has been working to a comparatively large milling capacity. The whole of the Lardeau district is more or less hampered by the lack of transportation. This, taken with the extremely precipitous nature of the country, has rendered a section of the Kootenay, which is probably second to none in richness and in continuity of veins, far slower in development than would have been ordinarily expected by the promising nature of the ore returns so far made by the properties which have been developed.

KOOTENAY LAKE.

The most marked feature of mining on Kootenay Lake is that afforded by the work on the Blue Bell mine. For a long time past the Blue Bell has been known to be a property with larger ore deposits than almost any other in that part of Kootenay covered by the name of Kootenay Lake. The ore found has not been in veins; it is rather in pipes. It is not high grade; has a considerable percentage of zinc, and is

near the water's edge. Although there have been so many difficulties in the way of the carrying of this project, and so many problems to be solved that, although known for years past, little or nothing of importance was done until taken up by the present company under the advice of S. S. Fowler. At the beginning of the year it had only been decided that the development of the veins or pipes should be so far carried forward that an accurate knowledge of the ore to be shipped could be obtained. This was

accomplished in the following manner: The disposal of this ore is becoming a thing that is becoming of the utmost importance, but it remains a question how best to dispose of the same. The disposal of the same is a thing that is becoming of the utmost importance, but it remains a question how best to dispose of the same.

Across the face from the Blue Hill is the old mine of Alameda, which is a group of small mines of the best properties in the whole of this section of the



Looking East, up the West Arm of Kaslo Creek, from the La Plata Mine. The tall smokestack is the La Plata Mill.

carried out on rather an extensive plan and by the end of June last Mr. Fowler had come to the conclusion that he had ore of payable grade sufficient to run a 200-ton mill for five years. Development was thereafter discontinued. As the ore was low grade, cheapness of work was absolutely essential, and it was determined to operate the mill and other works by hydraulic power. A flume and penstock were built carrying water for four miles from an adjacent creek to the mine. A 200-ton mill was erected; an efficient separating plant devised and a power plant installed. All this work is practically completed, and early in the new year work will be resumed and the

Kootenays. During the year much work has been done upon some of these, especially upon the Krao, the results of which are being anxiously awaited by the owners of surrounding properties. The Krao development has hardly as yet been carried to completion. Recently a shipment was made of some ore which, however, was merely taken out in the course of development.

Yet another section of this district is what is known as the south fork of Kaslo Creek, where are also a number of interesting properties. The chief interest lies around the rehabilitation by H. Geige-

rich of the Montezuma mine and mill, but recently closed down for the winter.

NELSON.

In the immediate vicinity of Nelson the Queen Victoria mine, a copper property, has shipped a quantity of copper ore to the smelter at Trail, and had the price of copper remained at normal figures there is no doubt but that this property would have shown more prominently in the mining returns of the year than it has done. As it is the management has under consideration a scheme of power development which they think should put the mine, at even present price of copper, upon a profitable basis.

Recent developments at the Granite and Poorman have shown the existence of a richer vein than had been anticipated, and considerable milling has been done.

The Eureka did some work early in the year, but lack of capital has hampered its operations since.

The old Fern mine started to work in the late fall, and has done some shipping, getting fair returns from its concentrates, but the drop in prices caused it to shut down.

There has been more work done than usual upon the Silver King and contiguous claims, such as the Grizzly Bear, during the year. The mine is now operated by the company, after having been in joint lease with M. S. Davys. It is understood that negotiations are afoot under which the property can be secured and worked upon a very much larger scale than at present, it being an open secret that the late management believed that the old vein supposed to have been lost, could be easily relocated on the unwatering of the lower workings, with the knowledge gained by recent developments.

YMIR.

The leading property in the Ymir district to-day is undoubtedly the Queen mine. This property is owned and operated by Wm. Waldie. It has been running continuously for eight years and is now in a better condition than ever before. Recently the capacity of the mill has been doubled and also that of the air compressor plant. The number of men employed has risen from 50 in the earlier portion of the year to 75 at its close. The ore is gold quartz, which is running from 7 to 24 ft. in width in the vein.

Adjacent to the Queen are the Kootenay Belle and Mother Lode mines. Some details supplied by these mines throw light upon the ore being shipped. Seventy-three cars sent by the Kootenay Belle to Trail and stamp mills, aggregated in value \$50,000, giving an average per ton of \$34.56. The value per ton of the ore sent to the smelters varied between \$31 and \$110. Fewer cars were shipped from the Mother Lode, but values were higher, varying between \$46 and \$156.

An interesting property close by, which is at present not a shipper, is the Devlin group. Here during the year a tunnel of 50 ft. has been driven and another of 130 ft., exposing ledges 3 to 7 ft. in width,

whose values will average \$13 and from which results have been obtained as high as \$145.

But the phenomenal strike of the year occurred in the Nugget, the average values of which were \$11. A ledge 9 ft. wide was discovered and 5 ft. of this is being sacked, rawhided and sent away for treatment.

The Arlington mine and the Second Relief have also been steady workers throughout the year, and there are other properties of less note than those mentioned scattered through the Ymir district, especially in the vicinity of Sheep Creek.

EAST KOOTENAY.

The chief developments of East Kootenay during the year have been those connected with the St. Eugene, Sullivan and North Star mines. The St. Eugene has been easily the largest shipper of any of the silver-lead mines. Its workings have been extensive during the year with the development up to the normal or nearly so. Considerable quantities of concentrates have been shipped to Europe, but in face of the low prices now offering, shipments have altogether ceased. The product of the St. Eugene is now sent entirely to Trail, the Hall Mines smelter at Nelson, which treated a part, having closed down under the adverse conditions prevailing in the late summer.

In connection with the St. Eugene may be mentioned a new scheme which is of some note in East Kootenay. This is the undertaking of the Cambrian Company. The St. Eugene lead is found on one side of Moyie Lake, and what is thought to be the same lead, with the same general strike, is found on the other side of Moyie Lake. It is thought, therefore, that the vein is continuous between these two points, and a mineral location has been made upon Moyie Lake itself, with a view of sublacustrine mining. A caisson is being sunk very nearly upon the vein itself, and on sufficient depth being gained the workings will be driven along the strike, under the bed of the lake.

The Sullivan has also been a large shipper during the year, about the middle of which a new strike of some importance was made on the property. It was supposed that this would have led to an increase in the capacity of the Marysville smelter, belonging to the Sullivan Company, but the management decided to thoroughly prospect and open up the new find before making any such enlargement. An enlargement of the smelter would mean more economical working, but on the other hand, if the supply of ore for any larger works were not continuous, the expenses of operation would be increased by it rather than decreased.

The North Star has also had considerable work done and a profitable future is predicted for this property.

There are two portions of this district, both of which contain properties which the owners declare to be second to none in the Kootenays, which at present are practically lying idle. These are the Windermere and the St. Mary's districts. With the building

of the Kootenay Central railway, does seem very certain, the Windermere mines, such as the Ponderosa, Red Line, Ptarmigan and others, will be opened up and worked. The properties named here have some development work already done and are simply quiescent until such time as transportation facilities shall be provided and give them an opportunity for economical working. The St. Mary's country is not as well developed, although it is known to possess properties which have been well thought of by some one, but most of which, however, are still mere prospects, the difficulties of transportation being far too great to admit of any serious expenditure. The opening up of the St. Mary's country will depend upon the building of a railway, already projected, which would connect Cranbrook or Fort Steele with Crawford Bay, immediately facing the opening of the West Arm of Kootenay Lake.

GOLDEN.

An interesting development is taking place at the present time about 50 miles south of Golden, upon the upper reaches of the Columbia River. This is the purchase of an undeveloped property by the Elmore people. The property is called the Giant and has a very large surface showing of galena ore, the vein or blow-out being 75 ft. wide. Last August H. H. Claudet, who is looking after the interests of the company in western Canada and the western States, commenced the erection of a small mill on the property. This is now nearing completion. Mr. Claudet says that of recent years there has been a big change made in the modelling of the Elmore oil process for the reduction of ore. The weaknesses which were shown in the first plants devised have been got rid of. Practically the whole thing has been remodelled. The machinery is now being made by Fraser-Chalmers, and many units have been introduced in various portions of Europe and in Australia, especially in the Broken Hill mine in the latter place. Mr. Claudet is of the opinion that successful demonstration at the Giant will mean the introduction of this cheap method of reducing ores in many mining camps.

Reports have appeared in the Newfoundland newspapers of the discovery of a very valuable deposit of copper ore on the Exploits River, in the vicinity of Red Indian Lake, within easy access to the railway, and not very far from good shipping facilities by water.

At a recent meeting of the agriculturists comprising the amalgamated Dominion Grange and Farmers' Associations of Ontario, among other resolutions adopted was one protesting against members of the legislature holding interests in Cobalt mining enterprises.

Japan is rich in zinc, but it is a large importer of the metal from foreign countries—it is said because the Japanese cannot refine it. It is now said that a Japanese has invented a method of refining the metal, and the work will be started on a large scale.

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Petersen and Rasmussen / Missing and 500,000

BOUNDARY DISTRICT MINES produced a large amount of ore in 1907, and the smelter kept pace with their production, treating practically the same amount of ore as in 1906. The *Phoenix Pioneer*, with characteristic enterprise, gives much detailed information concerning the progress made by the mines and smelting works of the district, and the important results they achieved. The following review of the year is from that journal:

In spite of the many drawbacks of the year just closed, the tonnage of ore produced in 1907 at the mines of the Boundary lacks but a few thousands of tons of that sent out in the previous year, that for 1906 being 1,161,000 tons, and for 1907 amounting to a trifle less than 1,150,000 tons of copper-gold ore—most of which was reduced at the three Boundary smelters. Proof of progress, shown by plain figures, is the best evidence of advancement. This is available, for in spite of fuel and car shortages, and notwithstanding the mines being non-productive for practically one-quarter of the year, the product very nearly equals that of 1906.

When the year 1907 opened, the entire West was experiencing the worst storms known for many years, these completely paralyzing traffic of every kind. This cut very largely into the expected figures of the Boundary output, to commence with. Then there was a shortage of coke at the smelters, which was intensified when the labour troubles of the Crow's Nest Pass country came on in April. Coupled with this was the demand made by the Boundary miners for an increase in the wage scale, which was eventually granted, in view of the high price of copper then prevailing.

An excellent summer ensued, however, and the average tonnage of the combined mines sometimes ran over 100,000 tons per month, which was constantly growing. Meantime, however, the price of copper in the world's markets was turning somersaults, and before it stopped was cut squarely in half—from 26½ cents to 13 cents per lb.: a condition that gave cause for alarm to both the officials of the large mining concerns and the employees, who had

This uncertainty gave way to certainty in October, when the Dominion Copper Company closed both mines and smelter, being followed by the three other large producers—the Granby, B. C. Copper and the Consolidated companies—on November 11, when the high cost of production and the low price of the red metal. So things stood till early in December, when the Granby Company by offering the employees would accept similar wages to those of a year ago, being an average of about 50 cents per day.

less than the high scale. For three weeks the matter was held in abeyance by the men, but finally on Christmas Eve a vote was taken by which the men decided to go to work on December 26 on the scale offered, based at the mines on \$3.50 per day for miners and \$3 per day for common labour. This was widely hailed as a most satisfactory outcome of the matter, as the largest mining enterprise in the Province was thus enabled to resume operations and give employment to some 900 men.

PRODUCTION OF ORE.

For purposes of comparison, the following table gives the production of ore, in tons, in the Boundary for the last eight years:

1900 (six months only).....	96,600
1901	390,800
1902	508,876
1903	690,419
1904	829,808
1905	933,548
1906	1,161,537
1907	1,148,237
Total	5,759,825

It will be seen that each year up to 1907 has been one of steady advancement in the ore output, and despite drawbacks, 1907 very nearly equals that of 1906, the grand total being well up towards 6,000,000 tons. In the absence of definite returns as to values, and allowing about \$5 per ton, this gives a gross return of about \$30,000,000 in the eight years from the mines of the Boundary, and this is a fair indication of what may be expected in the future in this district, even if only a moderate rate of increase be allowed for.

In detail, ore shipment returns from the several producing mines of the Boundary district for 1907, as far as they could be ascertained and figures secured from those interested, were as follows, in dry tons:

Granby mines	613,537
Snowshoe	135,001
B. C. Copper Co.'s mines—	
Mother Lode	208,321
Emma	18,274
Oro Denoro	14,481
B. C. Mine	1,712
Dominion Copper Co.'s mines—	
Brooklyn-Idaho	55,548
Rawhide	64,173
Sunset	31,258
Mountain Rose	3,999
Riverside	90
Morrison	649
Sally	65
Duncan	40
Providence	700
Elkhorn	20
Strathmore	55

Skylark	224
Bay	30
Golden Eagle	60
Total	1,148,237

It will be observed that out of the total of more than 1,000,000 tons shipped and smelted in the Boundary in 1907, some mines had a smaller record than in 1906, due directly to the causes heretofore mentioned, while others did better than in the previous year. Granby would have sent out over 1,000,000 tons alone, had the mines shipped the year through instead of about nine months. As it was, Granby fell down by nearly 200,000 tons as compared with 1906. On the other hand, British Columbia Copper, which had its new and complete smelter in operation, nearly doubled its output, while again Dominion Copper fell behind. The total value of the output, however, for 1907 was probably worth at least \$500,000 more than that of 1906, owing to the high price of copper obtained during the first half of the year.

AT THE CAMPS—PHOENIX.

In the early days of the Boundary, for convenience among the trailblazers and prospectors, the community growing up around a mine of importance was given a name, which names have stuck to the localities, although prosperous towns and cities have also grown up in this section, notably, Greenwood, Phoenix and Grand Forks.

Phoenix camp, originally known as Greenwood camp, is the most important of the camps, both by reason of having the largest output of ore by several times over, and, in consequence, the largest number of men employed. There are about 1,000 men employed directly in mining in Phoenix when the large producers are all in steady swing. Of these the Granby Company has more than half, the others being employed by the mines of the Dominion Copper and Snowshoe companies.

Granby Mines.—In the last year advancement has been the constant rule at the Granby mines, in every respect. Without going into details, it may be said that the equipment at the Granby mines is now one of the most complete in British Columbia. Its 60-drill electrically-driven air compressor furnishes the power needed for drilling, pumping, hoisting, and many other uses at the properties, including diamond drilling and machine shop purposes. The ore is broken down in the immense stopes, run into chutes, thence into mine cars, thence to the crushers and ore bins, and so to the smelter—never being handled by hand or shovel from the time it is blasted till it comes out in the shape of marketable blister copper at the smelter—gravity being used in all operations for handling, as far as possible.

Nothing but stoping is going on at the No. 1 level of the Granby mines, where formerly two steam shovels were at work, it being found more economical to break and drop the ore in chutes to the lower

level. The No. 2 tunnel (on level 1) will now be used for a big output of ore, the 10-ton steel ore dumps being operated by a steam locomotive for pulling ore of the shaft rock breakers. Inside in turn, again, the ore on the No. 3 level.

On the No. 3 level also, there are the main power two 75-h.p. motors handling the long strings of mine ore dumps. The terminal for this level is on the Great Northern railway tracks and is splendidly equipped for handling a large tonnage—3,000 tons per day if necessary—including ore crusher, elevating machinery and ample ore bin capacity, with the

estimated production of 100,000 tons of ore per year.

As the Granby group of mines is being developed, the Granby group of mines is being developed. In the spring of 1910, the Granby group of mines was developed. The difference between the 1910 and 1911 production was 100,000 tons.

materially increasing this, a huge ore crusher—the fifth of this mammoth size ordered for the Granby mines—now being in process of installation, with ore bins, conveyor, etc., so that this will soon afford the com-



This view shows the surface as it was several years ago. The big knob (which was practically all ore), behind the power house and above the railway track, has since been quarried out and sent to the company's smelter at Boundary Falls.

usual economical railway dump-car loading facilities common to low-grade mines.

During the past year what is known as the Victoria shaft outlet has been brought into use, costing upwards of \$100,000, with its 250-h.p. electric hoist, three-compartment shaft, ore crusher, conveyor, ore bins, etc. A feature of this outlet is that ore can be loaded from both the Canadian Pacific and Great Northern railways can be loaded from the ore bins, thus making it useful for both railways. This outlet also can handle 3,000 tons of ore daily, if required, both railways having ample trackage facilities. The Great Northern spur to the Victoria shaft headworks is

company another outlet of large capacity. The C. P. R. has already built a new spur to serve the Gold Drop. The Granby mines proper will undoubtedly be connected with the Victoria shaft outlet by a large and the same at depth.

There is little doubt but that the Granby mines today could regularly furnish 5,000 tons of ore every 24 hours, if called upon to do so. The company is in the unique position, so different in the experience of many mining properties in other districts, of not only having the ore in the ground, but also having the means to keep up with the possible output of the

mines. As it is, the production and shipment of from 3,000 to 3,500 tons per day is an easy accomplishment for the Granby, with literally its millions of tons of ore opened up and blocked out, and which is being increased each year, notwithstanding the heavy drafts of 600,000 to 1,000,000 tons per annum made on the reserves.

The Victoria shaft is finished and equipped to a depth of 400 ft. The skips when loaded weigh about seven tons each, running in counterbalance. At the 400-ft. level electricity is being substituted for horsepower, a lot of specially constructed 7-ton steel ore dumps for use at that level having recently arrived here from Pittsburg. The electric equipment is now being installed and in a short time will be in running order.

While the heavy shipments have been going on steadily all these years, development at the Granby has not been overlooked, there being many miles of underground workings in the properties, and the ore reserves constantly increasing with development, an elaborate system of diamond drilling having given great satisfaction to the management in the results attained.

Granby's ore shipments for the past year have been as follows by months, in dry tons, being for nine months in reality, and then not always at fullest capacity, due to the causes mentioned:

January	31,162
February	32,465
March	63,826
April	70,518
May	5,072
June	72,820
July	80,216
August	54,077
September	74,667
October	86,711
November	39,003
December	—

Total tons 613,537

Dominion Copper Mines.—The second most important copper producers in Phoenix camp are the mines of the Dominion Copper Company, Limited, which ship to the company's own smelter at Boundary Falls, some 20 miles distant by rail. These mines adjoin those of the Granby Company and have been extensively developed this last year, especially the Idaho and Rawhide, while the Brooklyn mine of the company has been shipping steadily.

When operating at normal capacity the Dominion Copper Company employs from 200 to 300 men in Phoenix camp alone, and ships from 750 to 1,000 tons of ore daily. The Brooklyn-Idaho group is in the heart of the camp, while the Rawhide is about half a mile distant, adjoining the Snowshoe and Gold Drop mines. Altogether the Brooklyn mine has sent out close to 300,000 tons of ore since shipments were

commenced, and there is reason to believe that it can maintain shipments for a long time to come. The ore is all hoisted through a 350-ft. shaft from this mine and sent out over the C. P. R. The Stewminder, adjoining the Brooklyn, is also well equipped with machinery, but has not been operated much this year, attention having been concentrated on the company's other mines.

The Idaho mine has been extensively opened up by tunnels and open-cast or glory-hole work, making the breaking down of ore an easy and economical matter. This mine is served by a spur from the Great Northern, which connects with the C. P. R. about eight miles distant.

The largest producer of the Dominion Copper Company is the Rawhide mine, which, like many others in the Boundary, is a veritable mountain of low-grade ore. This property has six tunnels at different levels, and is opened up so as to be able to maintain a large output, up to 1,000 tons daily if need be, for years to come. This year the C. P. R. constructed additional trackage facilities for the Rawhide at a cost of some \$20,000.

To supply power for its several mines in Phoenix camp, the Dominion Copper Company has installed an up-to-date machinery and air-compressing plant, electrically driven. An air-pipe line was constructed nearly a mile to the Rawhide mine, and the 30-drill compressor supplies all the power needed for the several mines. The Idaho mine also has a shaft and a good electric equipment for use at the lower levels when needed, this mine being connected with the Brooklyn mine by a drift at the 250-ft. level, under the city of Phoenix. Owing to high working costs and the low price of copper, none of the Dominion Copper Company's mines have been operated since October, but a resumption is looked for early in 1908.

Consolidated Company's Snowshoe Mine.—One of the large copper shippers in Phoenix camp is the Snowshoe group, operated under lease by the Consolidated Mining and Smelting Company of Canada, Limited, the company operating extensively at Rossland, Trail and Moyie. At the Snowshoe mine a particularly aggressive campaign has been carried on this year, the ore shipments having been about 135,000 tons in the nine months of active operations. Thousands of dollars have been spent in equipment and development, and the property is to-day in shape to maintain a heavier output than ever before. In addition to the extensive workings underground, reached by a well-equipped 350-ft. shaft, and the main working tunnel, a large area of glory-hole work has been opened up, giving many thousands of tons of additional ore yet available.

The machinery plant has been completely electrified, and steam discarded. An electric locomotive now operates the mine cars at the tunnel level.

The Consolidated Company this year purchased outright, partly for cash and partly for shares, the assets of the Phoenix Amalgamated Copper Mines, Limited, which owned a dozen claims south of and

acquiring the Granby group. The results of the former being the War Eagle group. In addition, options were obtained on some kind of other mineral claims in the camp, near or adjoining the present holdings of the company, thus giving the Consolidated Company an extensive acreage in the Boundary camp. A comprehensive system of development was also inaugurated at the War Eagle group last summer, and arrangements made for electric power, the service line being now built. Diamond-drilling was also done on a considerable scale.

Up to the present the ores from the Snowshoe mine have been shipped to either the smelter of the British Columbia Copper Company at Greenwood, under contract, or to the company's own smelter at Trail, about 120 miles distant. The latter entailed a long railway haul over a range of mountains. From the extensive acquirements made by the company during the past year, it is believed by many that, in the not distant future, the company will have its own smelting works at some convenient point in the Boundary district, and so avoid either sending to a custom smelter or having the long railway haul. The company is one of the largest, most progressive and at the same time most successful, of those operating in British Columbia.

DEADWOOD CAMP.

Mother Lode.—The second most important camp in the Boundary is Deadwood, located about three miles west of Greenwood city, and the leading property in this camp is the Mother Lode group, owned and extensively operated by the British Columbia Copper Company, Limited. The Mother Lode mine is one of the oldest mineral locations in the Boundary, and has been steadily operated for years on an increasingly large scale. The mine is the company's chief producer, supplying the bulk of the tonnage for its smelting works at Greenwood. It is excellently equipped with modern machinery. Recently electricity was substituted for steam, and the 35-drill air compressor is being augmented by another machine of similar size, which is now *en route* to the property. Another ore crusher, with jaws opening 42x36 in., being the same size as the large crushers used at the Granby mines, is being installed at the Mother Lode.

During 1907, with the last two months omitted when the mine was not shipping, the Mother Lode shipped 208,321 tons of ore—double the amount that was sent out in the year 1906—the increased smelting capacity of the company's works calling for a larger tonnage. The mine is served by the C. P. R., and the haul being short, barely four miles, transportation is cheap and expeditious.

Normally about 200 men are employed at the Mother Lode, the company having an excellent boarding house, bunk-house and a number of comfortable cottages.

For a number of years the Mother Lode was worked to a large extent on the open-cast or glory-hole system, but during the last year or two the development and shipping has nearly all been from the

underground levels. The last improvement about the mine and its workings was the construction of a new shaft, about 100 ft. deep, to give access to the lower levels.

Sunset Group.—In Deadwood camp is another mine, the Sunset group, a mine owned by the British Columbia Copper Company. For a number of years the Sunset has been and is being developed by several different companies, but is now being developed by the British Columbia Copper Company. The ore of the Sunset has a large percentage of iron, which is useful in fluxing at the smelter of the company. A deep shaft was sunk on the property by the former owners, and a large machinery plant installed. This plant, however, being much larger than needed, was moved to the Idaho mine of the same company in Phoenix camp. A smaller plant operated by electricity was put in at the Sunset in 1907, this doing excellent service.

During the last year the management has been agreeably surprised at the results obtained from the Sunset ore and, because the mine was formerly valued chiefly for the iron contents of the ore, copper values have come in that give it no little added value. The mine shipped 31,255 tons in 1907.

General.—In Deadwood camp the Sudbury is a promising property that was acquired during the year by Spokane capitalists, a machinery plant in stalled and a shaft sunk some 200 ft., with a promising showing in copper ore.

Several hundred feet of work were done during 1907 on the Goleonda group in Deadwood camp, owned largely by Quebec men, and which promises to be a mine of importance with sufficient development.

The Moreen is another Deadwood camp mine, with electric equipment, and owned by Minneapolis capitalists, who have had considerable work done thereon this year, with promise of the mine turning out well when more work shall have been done on it.

On the Greyhound, in the same camp, a deal of work was done under bond, with encouraging results, as far as heard from.

SUMMIT CAMP.

In Summit camp the most important mines are now owned and operated by the British Columbia Copper Company. Chief among these is the Emma, in the same group being the Oro Denoro and the B. C. mine. The Emma has been owned originally by the Hall Mining & Smelting Company of Nelson owns a one-quarter interest in it. The ore has always been chiefly valuable for its iron contents, and is gladly accepted by the smelter at that town. When the owners of the property do not need the ore for their own smelter a ready market is found for it at the other reduction works.

In addition to the iron contents, large quantities of copper values have been found in the ores of the Emma, greatly increasing the mine's value. Extensive development, through an incline shaft, has proved the ore bodies to be much larger and more

valuable than at first supposed. The mine has therefore been equipped with a new 12-drill electric-driven air compressor.

Adjoining the Emma is the Oro Denoro, which is essentially a quarrying property, the ore being easily handled and shipped by either Great Northern or C. P. R. The Emma vein is believed to extend into the Oro Denoro. A new crushing and conveying plant has been installed at the Oro Denoro, about 200-h.p. being used here altogether.

The B. C. mine, in Summit camp, located about a mile from the Emma and Oro Denoro, and served by a spur of the C. P. R., was one of the earliest shipping properties in the Boundary, having sent out more than 100,000 tons of copper ore and having also gold values. In fact, the Montreal people who owned the mine are understood to have got all their money back, and then declined to prospect for more ore. Some time since the British Columbia Copper Company purchased the group of about a dozen claims outright for about \$20,000, the property having machinery, etc., worth nearly that sum. Since then it is said that nearly enough ore has been taken out by the present owners to pay their purchase price for the property—and they still have several hundred acres of mineralized ground to prospect whenever it shall be deemed advisable to do so.

The Mountain Rose mine, in Summit camp, is owned by the Dominion Copper Company. It is largely an iron property, being used as a flux at the company's smelter. It is served by the C. P. R., the ore being easily quarried and shipped to the smelter.

ACROSS THE BOUNDARY LINE.

In addition to the British Columbia Copper Company's Summit camp mines, it has a valuable property in the Napoleon, located near Marcus, Washington, which is chiefly valuable for its sulphur contents. An aerial tramway, with rock crusher and bunker at the mine terminal, and loading bunkers at the Great Northern railway terminal, were installed in 1907.

The same company is also operating the Lone Star and Washington, located just across the British Columbia boundary line, in the State of Washington, where development has been in progress throughout the year. Some 1,500 tons of high-grade copper ore have been sent out during the year, the ore shipped being taken out in development, it being the idea to place the mine on a permanent shipping basis.

BOUNDARY SMELTING RESULTS.

As with mining, the three smelters of the Boundary have not been able to operate full time during the year. The British Columbia Copper Company's smelter has been out of commission nearly two months, that of the Granby nearly three months, and the Dominion Copper Company's works more than three months, due to various causes, lack of ore being certainly not one of them. When this is taken into consideration, the result of the year, as compared with the previous year, is certainly encouraging. The following is a summary of the tonnage treated at the

three district plants for 1907, the figures being official:

B. C. Copper Company's smelter.....	341,952
Granby Company's smelter	637,626
Dom. Copper Company's smelter....	153,439

Total tons 1,133,017

At the Granby smelter, little was done during May, November and December, so the results were confined to about nine months' operations. Therefore the smelter had but a short time in which it could get its recently enlarged battery of eight furnaces in fullest operation. During the year many improvements were made about this plant, including new steel furnace buildings, steel flue-dust chamber, greatly enlarged ore and coke bunkers, etc. The plant is now in condition to maintain a steady tonnage of 3,000 tons or more per day, even when allowing for some minor delays for repairs. The following was the tonnage treated in 1907, by months:

January	31,128
February	34,064
March	67,525
April	72,170
May	5,072
June	75,934
July	84,261
August	55,295
September	79,167
October	91,690
November	41,320

Total, tons 637,626

Of the above amount only 21,118 tons consisted of custom ore, the balance, 616,508 tons, being ore received from the company's Phoenix mines during the year.

At the smelter of the British Columbia Copper Company the year, while not up to expectations, showed a gain of more than 100 per cent. over 1906 in point of tonnage treated. A new crushing plant, with additional ore bins and conveyor, were installed during the year, with electric drive, and the water system was duplicated. Additional slag hauling equipment was also installed, and additions were made to the machine shop. The following is the tonnage treatment by months for the year:

January	21,133
February	15,427
March	23,678
April	34,127
May	29,969
June	44,316
July	47,768
August	38,161
September	35,567
October	31,334
November	20,472
December .....	.....

Total tons 341,952

The above tonnage treatment of the Boundary Falls smelter is as follows: Ore from Mother Lode, 113,439; from the Oregon, Denison, 16,499 tons; Starvation, 8,100 tons; Lone Star and Washington, 1,281 tons; H. C. mine, 1,711 tons; other material from the Portland mill, 5,870 tons; other material from the Central smelter, 15,556 tons. Besides the above, the Kinnear camp, during the year 727 tons to the Nelson smelter; 15,455 tons to the Granby, and 240 to the Trail smelter.

At the Boundary Falls smelting works of the Dominion Copper Company the tonnage treated fell off

At the Dominion Copper Company's plant, just acquired from the old owners, management of the smelter, after the complete system was installed, is being carried on in a manner so that the results will fall far short of what might be expected.

Continued work has been done at the several other Boundary camps this year, outside those mentioned above.

Franklin camp, at the headwaters of the north fork of Kettle River, about 40 miles north of Grand Forks, has some extensive prospects. Most of the



SMELTING WORK AT THE BOUNDARY FALLS.

The Jewel is the largest gold mine now in the district. Work at the Jewel Copper mine of the same company is in preliminary work has been done and tests are being made with the object of determining the most advantageous method by which to treat the ore.

considerably from that of 1906. This was due, not only to the fact that nearly four months were lost, but also that the enlarged plant was in commission only part of the operating year. No custom ore was treated. The monthly totals were as follows:

January	11,935
February	7,216
March	20,315
April	14,000
May	1,207
June	14,000
July	23,052
August	28,577
September	22,197
October	7,669
November .....	.....
December .....	.....

Total tons 153,439

work done in 1907 has been in the Granite Land group, where some small prospects have been located, but this property and the well-known McKinley, Gloucester and others are all handicapped by being so far from transportation. This, however, is gradually being remedied, the Kettle Valley railway having a charter to build to and through Franklin camp, and this year having actually completed 20 miles of construction and tracklaying. When the road shall be completed it will be a great stimulus to this camp.

The Granite Land mine, which has been idle for some years, and recently made test shipments to the Granby smelter. The Little Bertha, in the same part of the district, has also been developed.

A number of small prospects in this district have had considerable work done there. The most interesting of them have reached the

regular shipping stage. Nevertheless, there can be but little doubt that some good mines will be developed in the north fork section.

Long Lake camp has one mine at work—the Jewel, where a small force is kept busy, there being an adequate machinery plant. It is understood that the Scottish owners of the property will make some shipments of the gold ore this winter over the snow, the mine being located only about six miles from Eholt, the nearest railway point.

Camp McKinney was more active than for several years, the Cariboo having been operated under lease by a syndicate of residents of Phoenix. This mine had paid more than \$500,000 in dividends in the past, having been a free-gold producer, with a full equipment of machinery, stamp mill, etc., and having extensive underground workings. The present lessees have sent out some gold bricks and a car of concentrates. It is yet hoped that the property will redeem the good name it had for many years.

Nothing has been done this year in Wellington camp, which in the early days of the Boundary had several shipping mines. It is understood, however, that the Dominion Copper Company, which owns the Athlestan group in this camp, will once more, in the not distant future, operate the property, it being a gold producer with good values, and having already shipped over 10,000 tons of ore, even though distant two miles from the nearest railway siding of the C. P. R.

On the west fork of Kettle River a number of high-grade mines have been worked to some extent during the year, and some shipments made, notwithstanding the 40-mile wagon haul to the railway at Midway. The Sally and Duncan were among these, and are said to be looking well with development. They are close to the surveyed route of the Midway & Vernon railway, confidence in the ultimate building of which is still strong, notwithstanding the many delays in getting the project on its feet. When it shall be built, it will open up a rich mineralized territory, and some good mines will undoubtedly be on the shipping list, but the ores of few are now able to stand the heavy expense of a long wagon haul. The Riverside mine, near Rock Creek, has also shipped a few carloads of ore this year.

On each side of Greenwood is a high-grade ore belt, which in past years has given good results, the gold and silver ore yielding all the way from \$60 to \$200 per ton by the carload. Not as much was accomplished in 1907 as previously, from one cause or another.

The Providence mine shipped some 700 tons of high-grade ore, but has not been in operation for some months. It is understood to be the intention of the Chicago owners to sink the present 600-ft. shaft to the 1,000-ft. level and equip the property with larger machinery.

The Skylark is another mine that has also made a good record in the past, being owned by a Phoenix company, and having practically been paid for by

ore taken from the mine. The coming year should also see this mine in operation once more.

In Skylark camp the Crescent mine has been idle most of the year, awaiting a long-delayed shipment of machinery. This is now installed and the property is being worked with the best electrical equipment of any mine in the high-grade class in the Boundary. The property is a silver and gold producer.

During the year the Strathmore has been operated almost continuously, the results having been quite satisfactory to the Chicago owners of the property.

Considerable work has been done on the Bay, the Elkhorn, the E. P. U. and a number of others that are well known in the high-grade section.

During the year the Le Roi mine, located about five miles from Camp McKinney, was bonded by a syndicate from Phoenix, and considerable development was done, giving a most encouraging showing.

GENERAL NOTES.

In past years some of the drawbacks to mining and smelting in the Boundary on a large scale, have been lack of adequate power and of sufficient coke for the smelters.

Originally the Cascade Water, Power & Light Company, with its 3,000 h.p. hydro-electric plant at Cascade, furnished the electric power used in district mines and smelters, but the plant was not sufficient for their requirements, so a couple of years ago the West Kootenay Power & Light Company, with extensive water power development at Bonnington Falls, on Kootenay River, near Nelson, was induced to build 70 or 80 miles of double high-tension power lines into the Boundary. Last summer, the West Kootenay Company bought out the Cascade concern, and it now supplies practically all the electric power used in the Boundary. This company has ample power at its command for years to come, even though the industry in this section should expand much faster than anticipated by the most optimistic resident of this district. So there is no further any apprehension whatever on that score.

Intermittently, for the last three years or more, there has been a shortage of coke at the local smelters, the coke coming from the Crow's Nest Pass country in East Kootenay. Over and over again have operations been stopped or seriously curtailed at the smelters because of lack of coke, sometimes caused by labour troubles at the coal mines and again because the coke could not be produced in sufficient quantities. Last summer the matter came to a head, when the Granby Company, the largest consumer of coke, settled things by purchasing a large block of stock in the Crow's Nest Pass Coal Company. This gave the Granby representation on the board of the coal company, and since then there has not been a shortage of coke.

Summing up the situation in the Boundary, it may be said that, while the year 1907 has not been as productive as anticipated when the year began, still certain problems have been worked out in a satisfactory manner, and the close of the year finds that

the tonnage produced has reached a satisfactory figure, the 1,000,000 ton mark per annum having been passed by the shipping rates of this winter last year. There is every reason to believe that this will be largely exceeded in the future. Mines and smelters, while still being improved with more and larger machinery, are now in such a shape that increasingly large tonnages may confidently be expected, and while last year gave employment to about 2,000 men in the mines and smelters of the Boundary, the year 1908 should see an increase above that number.

THE LE ROI MINING COMPANY, LIMITED.

Eighth Ordinary General Meeting.

L E ROI MINING COMPANY shareholders held their eighth ordinary general meeting in London, England, on December 23, instant. T. D. Grimke-Drayton, J.P., chairman of the company, presided. The report of the directors, together with the audited accounts for the financial year ended June 30, 1907; also the reports of the managing director and the mine superintendent, respectively, were submitted, as follows:

DIRECTORS' REPORT.

"The directors herewith submit their report, together with the audited accounts of the company, for the year ended June 30, 1907, and also the annual report by A. J. McMillan, managing director, dated September 28, 1907, and the report by A. G. Larson, mine superintendent, dated September 12, 1907.

"The accounts show a balance in favour of profit and loss of £3,582 4s. 5d. on the operations of the company for the year under review. This result is arrived at after writing off £22,690 15s. 8d. in respect of exploration and development, and £7,766 13s. 7d. on account of depreciations of machinery and plant, surface improvements, etc., at the mine and smelter. The profits for the year have been lessened by the heavy fall in the price of copper, which seriously affected the realization of stocks in transit and on hand June 30.

"From the accounts it will be seen that the liabilities of the company at June 30, 1907, amounted to £45,329 12s. 7d., and the liquid assets, as exhibited in detail on the balance sheet, to £119,589 11s. 11d., showing a surplus of liquid assets over liabilities of £74,259 19s. 4d.

"Reference to the attached reports will show that during the fiscal year 131,696 tons of ore, of an average value of \$10.49 per ton, were mined and shipped to the smelters at Northport and Trail. The metallic contents of the ore showed a falling off during the latter part of the year, which is particularly noticeable in regard to the gold values in certain portions of the mine; the reduction in values for the whole year having been equivalent to about one-tenth of an ounce of gold per ton of ore mined. Fluctuating values in ores of apparent similarity have been frequently experienced in the Le Roi mine. The follow-

ing table shows the shipments and value of the ore in recent years:

	Tons.	Value per ton.
1904	187,140	\$10.94
1905	114,960	12.41
1906	149,912	12.35
1907	131,696	10.49

"During the year the sinking of the main working shaft was continued from the 1,350-ft. level to the 1,650-ft. level of the mine. This should prove of great value. The system of power, as far as it goes, at the present level, is as thorough as required and running up. Extensive development has been carried on during the year in a series of which large bodies of ore have been exposed. Whilst much of this ore, so far as at present developed, is low grade, bodies of higher grade ore are encountered from time to time, and now that the further sinking of the main shaft has made it possible to thoroughly explore the lower levels of the mine, it is hoped there will be an improvement in this direction.

"By reference to the managing director's report it will be seen that owing to unsettled labour conditions prevailing generally throughout the country during the greater part of the year, not only at the metalliferous mines, but in connection with the collieries and railways, there have been many difficulties to contend with. Notwithstanding that there has been a considerable increase in the cost of labour and supplies, the operating expenses have been kept at a very low level.

"The Trail smelter contract of October, 1905, entered into by the late board of directors, was cancelled during the year and shipments to Trail ceased in April last. The Northport smelter, after having been closed down for about 15 months, recommenced operations towards the end of December last, and continued running until January 25, when it was closed until February 28 on account of transportation difficulties and fuel shortage. During the period under review there was, therefore, only a continuous run of four months at the smelter.

"The directors propose that in future the financial year shall end on September 30, instead of June 30 as at present. It is felt that this arrangement will enable the report and accounts to be presented to the shareholders nearer the end of the financial year than has been the case in the past, and it will also enable the affairs of the company at Rosland and Northport to give full attention to the ordinary work of the company at the closed time of the year. This change, too, will be in line with the recommendations presented to the managing director having to leave Rosland to attend the annual meeting at a time when it would be advantageous for him to be at the mine.

"T. D. Grimke-Drayton, Chairman of the company, spent about three months during the summer of 1906, visiting the mine and smelter, and looking into the affairs of the company in British Columbia and at

Northport. Last spring, Charles Dunderdale, another of the directors, also visited the mine and smelter. As Mr. Wilson was at Rossland and Northport in 1905, all the members of the board are now personally familiar with the property of the company.

"G. W. Wilson retires from the board in conformity with the articles of association, and being eligible, offers himself for re-election. The auditors, Price, Waterhouse & Co., of London, and Clarkson, Cross & Helliwell, of Vancouver, British Columbia, also retire, and offer themselves for re-election."

REPORT FROM MANAGING DIRECTOR.

"Throughout the fiscal year ended June 30, 1907, now under review, there have been many difficulties to contend with, chiefly in regard to smelting matters, shortage of fuel, and unsettled labour conditions.

"As you are aware, a contract was entered into by the directors of this company with the owners of the Trail smelter, dated October 10, 1905, providing for the shipment of the whole output of the Le Roi mine to the Trail smelter for three years from that date. After lengthy negotiations this contract was cancelled, and a new one substituted therefor, dated

during the year received an increase of wages amounting in many cases to an advance of 75 cents per day. The working hours were also shortened in certain departments of labour. In the latter part of 1906 and again in the spring of 1907 there was serious trouble in the Crow's Nest coalfields, whence our fuel is obtained, causing a cessation of labour there and a shortage of coal and coke supplies.

"General Review.—At the end of the fiscal year the mining and other properties owned by the company remained the same as at June 30, 1906, with the addition of three mineral claims, viz., the Durham, the Tat Fraction, and the Treadwell, covering an area of about 50 acres. It was deemed advisable to acquire these on account of their contiguity to the Black Bear claim.

"The report of our mine superintendent, A. G. Larson, which is appended hereto, deals with the mining operations of the company. Mainly owing to unsettled conditions at the collieries interfering with our fuel supply, the mine was only operated 324 days, as against 336 days in the preceding year.

"The following table gives the comparative costs for operating expenses at mine and smelter, realization charges, and depreciation for the last four years:

	1904.	1905.	1906.	1907.
Tons of ore shipped	160,110	114,960	110,042	131,696
Ore production	Cost per ton. \$2.65	Cost per ton. \$2.78	Cost per ton. \$2.84	Cost per ton. \$3.00
Exploration and development (amount written off)...	0.94	0.90	1.26	0.84
Depreciation on mine account	0.21	0.34	0.36	0.20
Smelting and realization (direct and indirect), including freight, interest, depreciation, etc.....	6.77	6.06	6.04	5.98
	\$10.57	\$10.08	\$10.50	\$10.02

August 23, 1906, under the terms of which it was agreed that a certain stipulated tonnage was to be accepted in full settlement. This left about 50,000 tons to be delivered at the date of the arrangement referred to. Toward the end of last year the owners of the Trail smelter declined to accept such deliveries of ore as we were prepared to make under the contract, claiming that they were unable to do so on account of shortage of ears and motive power on the railway, and inability to secure adequate supplies of fuel for smelting operations. For nearly two months from October 13, 1906, the Trail smelter failed to take any of our ore. Under these circumstances, in order to avoid shutting down the mine, we commenced, early in October, 1906, to ship ore to the Northport smelter, placing it in the yards there until such time as we could arrange to start the works. This involved considerable expense in re-handling the ore, but was less costly than it would have been to suspend operations at the mine. Shipments to the Trail smelter ceased on April 11 last.

"Labour conditions during the year were very unsettled, not only in Rossland but generally throughout the mining districts of British Columbia and the United States. The men employed at the mines

"During the year \$164,468.99 was expended on the exploration and development of the mine, of which \$49,544.83 was incurred in connection with the sinking of the five-compartment main working shaft of the Le Roi mine from the 1,350- to the 1,650-ft. level. A winze was also sunk from the 1,650- to the 1,750-ft. level of the mine. The amount written off capital on account of development expenditure incurred during 1907 and previous years was \$110,050.30.

"The Northport Smelting Works.—The plant, which was closed down by order of the late board on October 17, 1905, was restarted and commenced smelting ore on December 26, 1906, and continued until January 25, 1907, when it was closed on account of fuel shortage, caused to some extent by the extreme severity of the weather. On February 28 smelting operations were resumed and continued for the balance of the fiscal year. During the period under review the smelter was operated for 154 days.

"The ore smelted at Northport during the year ended June 30, 1907, amounted to 51,582 dry tons. The matte shipped was 753 tons, of the net value of \$339,036.30, equal to \$449.98 per ton.

"Various lawsuits, which have been pending for

some years past, and one of which affected the water rights connected with the Northport smelter, were settled during the year. In connection with the settlement of this water suit we secured an interest in certain lands over which our water right passes, and also secured a right of way for our water flume, which should prove to be of great value in the future.

"The company's holdings in the name of the Northport Smelting and Refining Company, remain the same as on June 30, 1906, with the addition referred to.

"General Remarks.—During August and September, 1906, our chairman, T. D. Grinke Drayton, visited Rossland for the purpose of looking into the affairs of the company. Mr. Drayton, who is a mining engineer of long experience, spent a great deal of time inspecting the mine and looking into matters connected with the smelter and with the general business of the company. I received much valuable assistance from him in negotiations leading to the cancellation of the Trail smelter contract, and also in straightening out disputes of many years' standing affecting our water rights at the Northport smelter.

"In April last we had a visit from Charles Dunderdale, another of the directors, who, being in Eastern Canada, came specially to British Columbia, spending several weeks here, looking into the business of the company.

"It will be noticed by reference to Mr. Larson's report, that there has been a falling off in the metallic contents of the ore as compared with the previous two years. This is particularly so in the case of the gold values in some of the newer ore bodies in the mine, but judging from past experience in the Le Roi, it may reasonably be expected that this condition will be changed as other ore bodies are opened up. Fluctuating values in ores of apparent similarity has always been characteristic of our ore, a fact to which attention has frequently been called by managers in past years. Development work has been well kept up, and operating costs were low when the conditions referred to in this report are taken into consideration."

REPORT BY MINE SUPERINTENDENT.

"I have the honour to submit my report on the mining operations of your company for the year ending June 30, 1907.

"Review of Mining Operations.—During the year under review, ore was extracted from the main, north and south veins, and from the Black Bear claim, the tonnage being made up as follows:

	Tons.
Main vein	15,330
North vein	5,339
South vein	8,560
Black Bear claim	28,407

341,699

"Main Vein.—The ore extracted from this vein was of a good grade, and came chiefly from the 100- and 900-ft. levels. Now that the main working shaft

is sunk to the 1,650-ft. level, development work will be undertaken on the hope of finding a depth the continuation of the ore bodies that existed in the upper levels of the mine, and which yielded a large tonnage in past years. The prospects for the future I consider encouraging.

"North Vein.—We are still extracting a limited tonnage from this vein. The downward continuation of the ore shoot on the 450-ft. level has been discovered on the 600-ft. level. Development is being pushed in this part of the mine with satisfactory results.

"South Vein.—About 60 per cent. of the total tonnage of ore extracted during the year came from this vein, on which a large amount of development has been done, particularly towards the west. I propose to carry on considerable development work towards the east, with the idea of proving the continuation of the vein in that direction, where there is still a large extent of virgin ground.

"On the 1,200-ft. level various ore shoots of good grade have been opened up, and exploration work is being carried on with a view to further discoveries.

"Black Bear Claim.—In my report for last year I mentioned that an important ore body had been discovered on the 800-ft. level, west of the Josie dyke, and I called attention to the fact that, as this was the first discovery of ore on the property, it was of great importance. During the year extensive exploration was carried on, and ore bodies of good grade were opened up on the 900- and 1,050-ft. levels. Work is under way with a view to connecting up with the 1,200-ft. level. The total tonnage shipped from this part of the mine amounted to 1,441 tons during the year ended June 30, 1906, and 28,407 tons during the year ended June 30, 1907, and there is good reason to think that the output for the present year will be still larger.

"Ore Production.—The ore mined and shipped to the smelters at Northport and Trail during the past year amounted to 131,696 tons, its metal values averaging: Gold, 0.29 oz. per ton; silver, 0.44 oz.; and copper, 0.98 per cent., together equal to an average value of \$10.49 per ton.

"Development.—The details of development work during the year are as follows:

Work	Length	Development	Cost per ft.
Raising	47.6	\$1,004.88	\$41.00
Winning	97.0	4,010.05	41.34
Crosscutting	1,817.7	1,570.07	11.88
Drifting	4,429	69,560.22	15.71
Station raising		40,110	
P. & L. cutting		81.88	
	6,991	\$100,011.00	
Combination shaft			
(including stations			
and crosscutting)	1,000	100,000	
Diamond drilling	4,605	12,913.00	2.79

\$164,468.99

"Sinking of the Main Shaft.—The large five-compartment main working shaft was sunk a distance of 306.5 ft. to the 1,650-ft. level, at a cost of \$49,544.83, including the cutting of pockets and stations. This work should prove of the greatest value for many years to come, as it will enable us to open up the ore bodies which were shown to exist in the lower levels of the mine, by work carried on in connection with the winze, as referred to in previous reports. Connection is now being made from the main shaft on the 1,650-ft. level with the winze workings on the same level, and exploration work will be vigorously carried on.

"Diamond Drilling.—During the year 4,605 ft. of diamond drilling was done with satisfactory results. This work was successful in locating various ore bodies of importance, and in giving us much valuable information.

"General.—Owing to conditions prevailing throughout the country generally, a higher scale of wages is being paid than formerly, the cost of supplies has materially increased, and we have been hampered at times by the inability of smelters and railways to handle our ore, all of which has tended to increase the cost of production."

BALANCE SHEET AT JUNE 30, 1907.											
<i>Dr.</i>			£			s.			d.		
To Capital authorized									£	s.	d.
200,000 shares of £5 each					1,000,000		0	0			
Less—Calls in arrear					38		0	0			
									999,962	0	0
To Sundry creditors—											
London					109		11	5			
Rosslund					21,155		10	7			
									21,265	2	0
To Unclaimed dividends									143	8	3
To Reserve against sundry claims									4,782	2	4
To Profit and loss account—											
Balance brought forward from last year					171,927		9	8			
Less Final dividend of 2s. per share paid December, 1906, for year ended June 30, 1906.					£20,000		0	0			
Directors' percentage on dividend					1,000		0	0			
									21,000	0	0
									150,927	9	8
Add Profit for year ended June 30, 1907, as per account.					3,582		4	5			
									154,509	14	1
Subject upon distribution to the percentage payable to the directors under special resolution of Dec. 2, 1898									£1,180,662	6	8
<i>Cr.</i>											
By Property account—					£		s.	d.	£	s.	d.
Balance at June 30, 1906.					977,596		18	4			
Add—Expenditure during year and further property acquired					1,901		19	7			
									979,498	17	11
By Expenditure in connection with sundry options.									4,924	16	10
*By Machinery and plant, at June 30, 1906.					19,266		17	0			
Add—Expenditure during year					673		9	4			
									19,940	6	4
Less—Machinery sold					£ 239		3	9			
Depreciation					2,927		9	7			
									3,166	13	4
									16,773	13	0
*By Mine equipment, at June 30, 1906.					5,354		18	9			
Add—Expenditure during year					2,148		19	2			
Less—Sales					£ 71		10	1			
Depreciation					528		13	7			
									600	3	8
									6,903	14	3
*By Surface improvements and buildings, at June 30, 1906.					9,713		8	9			
Add—Expenditure during year					218		8	6			
									9,931	17	3
Less—Depreciation					1,923		16	6			
									8,008	0	9
*By Smelter plant and buildings, at June 30, 1906.					20,665		5	8			
Add—Expenditure during year					6,878		7	10			
									27,543	13	6
Less—Depreciation					2,215		17	9			
									25,327	15	

*These are balances of expenditure made since the property was acquired.

By Mining, including management and general expenditure in Rosslund 1884	£ 174	0	0
ADD—Expenditure in Rosslund 1885	59,085	2	0
Less—(Mining reserve, &c.)	2,000	15	0
By Treasury—(Ores and matte at mine and in transit, as estimated by the company's books)	1,815	13	0
ADD—Expenditure in Rosslund 1885	185	4	0
Less—(Treasury reserve, &c.)	2,000	15	0
By Ores and matte at smelter, in hand and in transit, as estimated by the company's books	£ 64	8	1
Less—(Ores and matte at smelter, in hand and in transit, as estimated by the company's books)	135	13	8
By Stores in hand at mine and smelter	18,334	4	0
By Ores on dump at mine	17,886	6	8
By Sundry debtors—	316	15	7
Less—(Sundry debtors)	911	4	5
By Cash at bankers and in hand	10,360	4	5
By Balance carried to balance sheet	6,000	0	0

*These are balances of expenditure made since the property was acquired.

Dr				
To Office expenditure—				
Mining, including management and general expenditure in Rosslund	81,420	19	5	
Amount written off mine development	2,300	0	0	
Depreciation on machinery and plant surface improvements and buildings, mine equipment, and furniture, fixtures, etc., at Rosslund	5,525	17	6	
To Smelting—				
Working expenses at smelter, including freight, and ores purchased from public	60,397	16	9	
Depreciation on smelter plant and buildings, and furniture	2,240	16	1	
Reserve against sundry claims	1,400	0	0	
To London expenditure—				
Office rent, lighting, etc.	2,000	0	0	
Office salaries	895	5	9	
Less Rents receivable for providing office accommodation and clerical assistance to other companies	885	8	4	
Printing and stationery	85	11	0	
Postages, telegrams and cables	149	9	3	
Legal expenses	21	10	6	
Expenses of general meeting	146	12	6	
General expenses	151	14	0	
Depreciation on office furniture	554	17	0	
To Audit fees in London and Rosslund	1,000	0	0	
To Balance carried to balance sheet	1,000	0	0	

Cr.	£	s.	d.
By Matte and ore sales (net proceeds)	105,217	18	9
By Rents received from Rosslund properties	491	3	0
By Ores and matte at smelter, in hand and in transit at June 30, 1907, as estimated by the company's officials	71,880	16	10
By Interest account	1,671	5	3
By Transfer fees	86	12	8
	£179,347	16	6

THE GENERAL MEETING.

The secretary (Harold A. Wesson) having read the notice convening the meeting, and the auditors' certificate and report, the chairman said: "Doubtless all of you have received our report and statement of accounts for the year ending June 30, 1907, and I suppose we may take these as read. I beg to move 'That the report and accounts for the year ending June 30, 1907, now submitted, be received and adopted.'

"It is a matter of great regret to your board that the profits have not been greater, but when we take into consideration the heavy fall in the price of copper realized in the later months of the year; the frequent stopping of work owing to the want of fuel and other causes; together with the high cost of wages, you will see how many difficulties we have had to face. Taking the Northport smelter, for instance, it only had a continuous run of four months, and the Trail smelter was unable for a long period, owing to being closed down, to take our ore which was contracted to it. During the year there has been a considerable increase in wages and in the cost of nearly all materials. Despite this, more has been spent on development than for several years past. The main shaft has been sunk to the 1,650-ft. level, and development pushed far into the Black Bear claim. You will, perhaps, remember that last year I told you that the pushing of development was absolutely necessary for the good working of our mine. Our ore, as you know, varies in quality, and it was unfortunate that the grade of ore showed a lower value just when we wanted all the help we could get. This variation in value has always been found in our ore, and I do not think it is so serious a matter as might appear, when we look back at the past experience of the mine.

"You will see from Mr. Larson's report that our expectations of finding ore in the Black Bear have been realized.

"There is one item on the debit side of the balance sheet which, I think, calls for some explanation. At June 30, 1906, the balance sheet showed a credit balance in profit and loss account of £171,927 9s. 8d., of which £90,097 1s. 7d. was in cash. This was to some extent the result of the closing down of the smelter, and the incidental cleaning up and realization of ore and matte. This item, as it has always stood in our balance sheet, is, I think, to some extent misleading. It would be impossible to ever distribute in dividends a considerable part of this credit balance, for the reason that it is invested in plant, improvement, development, and the like, owing to the

company having started with far too little working capital. I mention this, as I believe there is some doubt in the minds of the shareholders as to what it really represents. Your directors propose to give this matter their serious attention, and to deal with it in the next balance sheet.

"We propose to alter the financial year, as mentioned in our printed report, so that in future it shall end on September 30. Several shareholders have asked why there is so long a time between the end of our year and the holding of the annual meeting. The reason is, that from April to September is the busiest time at Rosslund, and this year the meeting was delayed because, time after time, Mr. McMillan had to put off his sailing for England, as matters of serious moment required his presence and attention in Rosslund. You will see, I am sure, that this applies equally to all our staff at the mine and smelter, who, just when their ordinary work is heaviest, have to turn their attention to closing the accounts and making the necessary reports in preparation for the annual meeting.

"You will also notice in the last monthly postcard you were told that we had appointed Mr. W. A. Carlyle, late general manager of the Rio Tinto Company, as consulting engineer to this company. This question has had considerable thought expended upon it. We wanted to get three things: Firstly, a man who had, if possible, previous experience of the peculiarities of Rosslund mines; secondly, who was not connected in any way with companies whose interests might clash with our own; and, thirdly, whose name and great and varied experience would command the confidence of the shareholders and the general public. I believe that in the choice of Mr. Carlyle, we have met all these requirements. I may say that Mr. Carlyle has arranged to go out early in January, and will meet Mr. McMillan at the mine."

Mr. G. W. Wilson: "I beg to second the resolution for the adoption of the report and accounts."

The chairman: "I daresay some of you would like to make some remarks on the report, but I think it will be better to allow Mr. McMillan first to address you, because there are several points to which I have not referred, and upon which he himself would like to speak to you."

Mr. A. J. McMillan (managing director): "Before proceeding to deal with the details of our annual business, I should like to say a few words with reference to the date at which this meeting is being held—a date much nearer Christmas than the directors like to see you called together. As the chairman has

explained. I was detained in getting away from Canada. We arranged for the meeting to be held in the 29th inst., but finding that the report and accounts could not be prepared, audited, printed and placed in your hands in time for this, we had to alter the date of the meeting to the 23rd—the alternative being the 30th or 31st of this month, which are not the most desirable days for the purpose. With the financial year ending at September 30, as it always shall do in future, we hope to hold the meeting nearer to the end of our year than has been the case in the past.

"With reference to the year ended June 30 last, the business of which we are here to consider, I join the chairman—and for that matter all of my colleagues—in regretting that the profits have not been larger. My interest as a shareholder in this company is so great, that if it had been possible to earn and pay a dividend this year, you may be quite sure one would have been forthcoming. Everything possible has been done to achieve satisfactory results. Owing to many difficulties, some of which have been referred to in the annual report, and by the chairman in his speech to-day, we have had a most worrying and trying year, notwithstanding which we have managed to keep working expenses down to a very low level. As you will have noticed from the report, the grade of the ore has this year shown a falling off as compared with the two former years, amounting to nearly \$2 per ton, which on our output of last year represents a difference of about £50,000 in value, an amount sufficient to furnish the wherewithal with which to pay a substantial dividend. This falling away in values we cannot prevent, much as we may regret it. It is an experience we have often passed through before, and the fact that Le Roi ore bodies are very irregular both as regards size and value—as indeed are most of the ore bodies in Rossland—is one to which the attention of shareholders has frequently been called in years gone by. Development work has been well kept up, and we have been successful in locating large ore bodies on the lower levels. Much of this ore, so far as at present shown up, is too low in value to yield a profit, though small bodies of pay ore are met with from time to time associated with the larger bodies of low grade ore. We are vigorously pushing exploration work on the lower levels and in other parts of the mine, and hope yet to come into larger bodies of payable ore. In certain parts of our property we have had an opposite and much more satisfactory experience. The development on the Black Bear, which has resulted in opening up an ore body of excellent grade, is a case in point. In 1906 ore was discovered there for the first time, and the assay value of the ore already taken out from this one body alone amounts to about £90,000.

"During the year we spent on exploration and development a larger sum than had been expended for years past. Included in this item is the cost of sinking the main shaft from the 1,350- to the 1,650-ft.

level, amounting to \$100,000 and £11,000. It was necessary that this work should be done in order that we could thoroughly explore the lower levels of the mine, from which much depends. As the sinking of the shaft cannot be completed at the end of the financial year, and we were therefore unable to derive any benefit from it during that period, the amount expended in connection therewith was carried forward, and this chiefly explains how it is that, as shown by the balance sheet, £33,911 was expended during the year under the head of 'mine exploration and development'—which cost £11,000—year written off.

"You will notice in the annual report reference is made to the fact that the profits for the year have been lessened by the heavy fall in the price of copper. This, perhaps, calls for explanation. Whilst it is quite true that copper was upon the average at a higher price during the year ended June 30, 1907, than it was during the preceding year, yet we have not benefited to the extent that might be supposed, owing to the fact that under the smelting contract made by the late directors we were compelled to ship our ore to the Trail smelter at a period when there was a rising copper market, and as the Trail people paid us for the ore a few days after it was shipped, we did not benefit by any subsequent rise in the price of copper, the profits from this source accruing to the benefit of the Trail smelter; whereas, shortly after the Trail contract came to an end, our copper which, under an old contract, was shipped to the Tacoma refinery and not paid for until nearly three months after being marketed, was to a large extent sold on a falling market. At June 30 last we had in transit and on hand nearly 900,000 lb. of copper, the whole of which was seriously affected by the subsequent fall in price, which occurred before payment was made. This depreciation in value, to the extent of more than £7,000, we have provided for in the accounts you have in your hands. The fall in the price of metals—copper, silver and lead—has been very great during the last few months. We have but a small amount of silver in our ores, and the fall in this metal does not materially affect us—whilst the fall in lead does not directly concern us at all, though many mines in British Columbia are seriously affected by it. As regards the fall in the price of copper, that is a matter of great importance to us. Practically all the copper producing mines in British Columbia, outside of Rossland, have been closed down, whilst many of the large copper mines in the United States and Mexico have either been closed down altogether or their output greatly reduced.

"The question you are no doubt asking yourselves—as indeed we all are—is this: What has the future in store for us? The monetary stringency in the United States has caused a great falling off in the demand for copper, and until this demand improves, the price will probably not rise to any great extent. The decrease in the output of copper should result in higher prices immediately there is any considerable

demand for the metal. Though the year just closed has not been as successful as we could have wished, we are entitled to remember that it is considerably better than some of its predecessors. Looking forward, there is a satisfactory feature to be noted in connection with labour, in this respect; that in view of the well-known difficulties we, in common with others, have to contend with, and are doing our best to overcome in carrying on mining and smelting operations, the men employed at our mine and smelter have agreed to accept as from the first of this month, a substantial reduction in wages.

"It may be of interest, perhaps, if I call your attention to the fact that one-half, or thereabouts, of Le Roi ground is virgin territory, not yet developed, and that we are pushing exploration work in this new ground, as also in different parts of the older portions of the mine.

"Mr. W. A. Carlyle, for a number of years and until recently general manager of the Rio Tinto mine in Spain, prior to which he was resident manager at Rossland of the Le Roi mine, having this year established himself as a consulting engineer in London, has been appointed consulting engineer to this company. I am glad to see Mr. Carlyle on the platform with us to-day, and to be able to state that he is leaving for Rossland within a week or two, there to confer with me and other officials of the company in regard to many important matters in which we are interested.

"Though the present days are not quite so bright as some that have gone before, I look forward with hope to the future, trusting that better times are in store, and assuring you that at any rate nothing will be left undone to bring about that improvement you and I, and all of us, so earnestly desire. I have much pleasure in supporting the resolution."

The chairman: "If any shareholders have any remarks to make, I shall now be glad to hear them."

Colonel Banks said "he thought it was extremely unfortunate that they should have to meet so near Christmas, and he suggested that the meeting should be held at a more convenient time in future."

The chairman: "I entirely agree with you. We tried all we could to push the meeting forward, and I think you will agree with the proposition that has been made for changing the period of the financial year in order that the meeting may be held within a more reasonable time after the close of the year."

Mr. Joseph Horton said "he would like to ask, seeing that the accounts were made up to June 30, and the meeting was being held six months subsequently, when, if the accounts were closed in September, the meeting would be held. He presumed it would be held within a few weeks."

The chairman said "it would be impossible to get to London, within three or four weeks of the closing of the books, as had been suggested, the annual accounts of any company such as this, whose operations were carried on 6,000 miles away. What would happen in the future would be that the accounts

would be closed on September 30, and the annual meeting would probably be called early in January, and the benefit would be that the shareholders would have all the information up to the end of September, whereas now the information they had was nearly six months old."

Mr. Horton said "he did not see why, if the accounts were closed on June 30, the meeting should not have been held in September."

The chairman said "he thought he had made that clear in his speech. The period from April to September was the chief time during which the work went on at Rossland; that was the time when Mr. McMillan and his staff were up to their eyes in the practical business of the company. He had had several telegrams from Mr. McMillan during that period, announcing his intention to sail, and then something important came along, and he was obliged to stay. The busy season continued until the end of September, and until he could come over and get all this information together they could not hold a meeting."

Mr. Horton said: "Mr. McMillan had referred to the fall in the price of copper. As far as he had been able to follow the papers, the price of copper up to July had been phenomenally good, and the fall in the price was only quite recent; therefore they ought to have had the benefit of the high price of copper in this year's accounts. He thought, also, they ought to have an income and expenditure account, giving more details. He saw that the profit on the year's work was £3,000 odd, and the clerical staff for London alone cost over £2,000. This seemed abnormally large. Then, as regarded the low grade of ore, he had followed the monthly reports, and reckoned it out as being worth £2 per ton. In some companies they could treat the ore at 16s. per ton, and therefore he thought they had had ample margin to make a decent profit."

The chairman said, "with regard to the fall in the price of copper, he did not think the shareholder who had just spoken had followed what had been said. The copper mined up to the last day of June was sent on later to the refinery, and was not paid for until nearly three months afterwards. It was quite true that in the month of June copper prices ruled high, but the price they were paid was the price ruling two or three months later. With regard to an income and expenditure account, the board would take the suggestion into consideration, and see if they could make the matter a little clearer."

The managing director, in answer to a question, said "the operating costs per ton amounted to \$10.02 on 131,696 tons, and there was a reduction at the refinery for losses in dealing with the matte."

The resolution was put to the meeting and carried unanimously.

The chairman: "The next business is the election of a director. Mr. G. W. Wilson retires in accordance with the articles of association, and offers himself for re-election. I have much pleasure in pro-

posting that he is concerned in a prospect of business party. I have had the pleasure of knowing him for some time, and I can assure you, for great financial knowledge has been of extreme assistance to the board. He has also a personal knowledge of the mine and smelter, and, curiously enough, every other member of the board has a knowledge of them also. I am sure I cannot put before you a better name than that of the gentleman of this office."

Mr. Charles Dunderdale: "I have great pleasure in seconding the resolution. There is no doubt that Mr. Wilson is a most valuable ally in this small board that you have in Le Roi, and his large business experience and the able way in which he tackles the financial work of the company—the balance sheet particularly, when it comes up for discussion—makes me confident in asking you to re-elect him."

"I should like, before I sit down, to say a word or two with regard to a visit I made to Rossland to see the mine and smelter this year. Business took me to Eastern Canada, and naturally I thought I should like to take a trip across the continent and see something of the property in which we are all interested. I spent about a month altogether on my journey, and I am bound to tell you that I consider the mine is in every respect managed most excellently. I hope, if any of you go to America, you will take the opportunity of running over to Rossland to see for yourselves how harmoniously everything is working. It is unfortunate we are here to-day to discuss a position which does not satisfy you any more than it does ourselves; but we cannot make 'a silk purse out of a sow's ear,' and when we have ore showing a diminution of 15 per cent. in value, it is difficult to earn dividends. All I can tell you with regard to my visit to Rossland and Northport is that all the people connected with the mine—from Mr. McMillan down to the poorest miner—are doing their utmost to get us the dividends we all want so much. Whether we can get them remains to be seen; but you may be sure that Mr. McMillan and his staff are doing their best to get them for you."

Colonel Banks suggested that there was no necessity for four directors.

Sir Frank Crisp (the solicitor to the company) pointed out that if they had only three directors, one of whom was Mr. McMillan, they would only have two in London when Mr. McMillan was at the mine.

Mr. Horton asked Mr. Wilson to give some further information as to the clerical expenses in connection with the London office.

The resolution was then put to the meeting and carried unanimously.

Mr. Wilson said: "I am very much obliged to you for this proof of your confidence. Of course, I know that in good times directors have an easy task in getting re-elected; but when times are bad it is difficult for shareholders to understand that it is not the fault of the directors, and then their path is not such a pleasant one. I can assure you that the results of the year are not in any sense due to any

obstacles on the part of the persons in attendance to the work. I have had considerable time, from December last, on my spare hours, and, in the face of the depreciation in the values of the ore, which the directors cannot possibly help. Your mine is being managed as well as it is possible to manage it; but no management can improve the ore. But I think the step we have just taken in appointing Mr. Carlyle as engineer is a good one. He is going out there, and I believe we shall, before very long, benefit by adopting that course. I cannot promise that your directors can do anything better for you than they have done; but I can assure you the business of the company has been directed in its management in a prudent and safe manner. With respect to the question of expenditure, I would point out that the expenses in connection with the London office are smaller this year than they have ever been in the history of the company, and we are today fortunate in obtaining a credit of £300, which is a reduction amounting to about £300."

A shareholder: "What is the life of the mine?"

The Chairman: "It is impossible for any man to tell you. I happen to be a mining engineer, but I should not like to make any statement as to the life of the mine. We will now proceed with the appointment of the auditors. I will ask some shareholder to move a resolution on the subject."

Mr. A. W. Taylor, J.P.: "I beg to propose that Messrs. Price, Wainwright & Co., of London, and Messrs. Clarke, Cross & Hall, of Vancouver, British Columbia, be re-elected auditors, at the same remuneration as before."

The resolution was seconded, put to the meeting, and carried unanimously.

Mr. A. J. McMillan (managing director): "I rise to move the following resolution: That article 105 of the articles of association be cancelled and the following article substituted: 'The directors shall be entitled to receive for the year ended June 30, 1907, and for each succeeding year, by way of remuneration, the sum of \$100 to each director, \$100 additional £50 for the chairman, and also such further sum as shall make the total remuneration payable to the directors equal to 5 per cent. of the dividends paid to the members of the company for the year. Such further sum to be divisible equally among the directors, except that the chairman shall be entitled to 50 per cent. more than any other director. The directors shall be entitled to be remunerated in any way they may incur in attending meetings of the board or of committees of the board, or general meetings.'

"In the notice sent to the shareholders convening this meeting you will have observed that notice was given that this resolution would be proposed to-day. I have received a letter from a shareholder who intended to have been here and to move the resolution just read to you, and in that letter he expresses regret that he is unable to be present and do so himself. The duty therefore devolves upon me to move the resolution. I may say that I was consulted about

this question, and that I have discussed the matter with some of the largest shareholders, who approve of the step proposed to be taken. To make quite clear the object in bringing forward this resolution, I may point out that, with the exception of the managing director, not one of the directors receives anything for his services or on account of out-of-pocket expenses incurred in attending meetings and looking after the business of the company, unless a dividend is paid. Put into practice, this means that for six years out of the eight during which the company has been in existence, Le Roi directors have worked without fee or reward. When this company was formed the articles provided for a yearly payment of £200 to each director, the chairman to receive £300. On December 2, 1898, that article was cancelled and the following substituted therefor: 'That article 105 of the articles of association be cancelled, and the following article substituted: The directors shall be entitled to receive out of the net profits in each year, the following remuneration, namely: A sum equal to five per cent. of all dividends distributed among the members of the company, divisible equally among such directors, except that in such division the chairman shall be entitled to 50 per cent. more than any other director.'

"It is obvious that when there are no dividends the directors under existing arrangements do not receive any remuneration, and any man who knows anything about business matters connected with large companies knows there is far less work in connection with the management of a company when everything is going well, than there is when difficulties have to be dealt with. I invited my three colleagues to join the board some three years since, and you were good enough to elect them; but I must say I do not like to ask men of standing and of large business experience to come here and spend hours and days looking after the interests of some 3,000 shareholders in the company unless they receive some small remuneration for the time and attention they give to our business. Our directors spend a great deal of time—frequently several days a week—attending to this business, and, in addition, the chairman in particular devotes a good deal of time to its affairs when at his own home. It is not intended that this remuneration shall be in addition to the 5 per cent. In years when a dividend is payable, the amount will be merged in the sum to which the directors would then be entitled."

Mr. Davis: "I have very great pleasure in seconding the resolution. I have had a great deal of experience in limited companies and attending meetings, and I do not think I have seen a resolution more absolutely fair to the shareholders than this one. I think what Mr. McMillan has said must appeal to the shareholders. It is not fair we should have a board of directors devoting a great deal of their time to the business of the company without having some remuneration. The remuneration proposed is very

small, and I think this resolution ought to be passed unanimously."

Colonel Banks said "he did not believe in directors working for nothing, but considering that the company was not now in a flourishing condition, he thought it would be a gracious act on their part to forego fees for the present."

Mr. Horton said "he should not vote against the resolution because he did not believe in men working for nothing, but he thought it would be rather nice if the directors were to waive their fees and be content with their out-of-pocket expenses."

Mr. A. W. Taylor said that "as the directors received payment last year by way of percentage on the dividends paid, he thought they should be satisfied if this year they received their out-of-pocket expenses and something more as a recognition of their services, though he would suggest a smaller sum than that named in the resolution. He would not, however, vote against the resolution."

On a show of hands, the resolution was lost, but on the poll which was subsequently taken the result was: For the resolution, 69,350; against, 1094. The chairman thereupon declared the resolution carried.

A vote of thanks having been passed to the chairman, the proceedings then terminated.

Mr. A. H. Brooks, chief of the United States Geological Survey's Alaskan division, reports that various unfortunate conditions have led to a material reduction in the gold output of Alaska in 1907 as compared with that of 1906. Preliminary estimates indicate that the gold production for 1907 will be between \$17,000,000 and \$18,000,000, as against more than \$21,000,000 in 1906.

"Gold production in the far north," writes Mr. H. Mortimer Lamb in *Mines and Minerals*, "is not expected to exceed \$3,000,000 in value this year, the lowest in ten years; but this is no gauge of the real activity and development of the past season. Individual effort has, of course, ceased and most of the gold won this year was the result of dredging; but the chief feature has been the enormous expenditure of capital in providing equipment for future hydraulic working, by the completion of an elaborate system of fluming and ditching covering a distance of approximately 70 miles. It is stated that water will be available for the commencement of extensive hydraulic mining early next season by this system, while some half a dozen more dredges will be in operation. Hence, in 1908 will be inaugurated a new era for the Yukon, a beginning of mining on a colossal scale, of concentrated effort and the application of the most modern and scientific methods. The most recent intelligence from the Yukon is that another large area, including some 300 to 400 claims on Dominion Creek, has been acquired by corporate interests, and it is to be expected that ere long all remaining productive areas in the vicinity of Dawson will be thus absorbed and consolidated."

CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA, LIMITED

Second Annual General Meeting

THE SECOND ANNUAL MEETING of the holders in the Consolidated Mining and Smelting Company of Canada, Limited, was held in Toronto, Ontario, at November 28. The report of the Directors and of the general manager, and the statement of accounts follow:

DIRECTORS: 1919-1920.

"Your directors have pleasure in submitting the second annual report of the company, also the managing director's report, and the audited financial statement for the year ending June 30, 1907.

"The result of the year's business is not up to our expectations, as operations were handicapped by the strikes of the coal miners, which curtailed our supply of coal and coke; the unsettled labour conditions at

our own mines, and the scarcity of the weather during the winter months, which prevented a satisfactory output of ore.

"The management of the business has proceeded satisfactorily during the year, resulting in a large increase in the ore reserves.

"The following properties were being purchased during the year, namely, the Iron Mask, Idaho, and Enterprise claims adjoining the company's properties at Rossland, the payments for which have been made partly in cash and partly in stock.

"Since the close of the year negotiations have also been completed for the purchase of the properties of the Phoenix Amalgamated Copper Mines, Limited, at Phenix, B.C.; also for the purchase of the Keystone and Four Ace claims adjoining the Phoenix group.

"Important additions and improvements have been made at the mines, smelter and refinery, which are fully described in the report of the managing director."

FINANCIAL STATEMENT.

Liabilities.

Capital authorized \$5,500,000	
Issued 48,338 shares of \$100 each.....	\$4,833,800.00
Sundry Deposits:	
Bank of Montreal, Rossland—	
Interest and overdraft.....	\$1,500.00
Accrued interest.....	46,196.00
Snowshoe account.....	109,483.34
Canadian Metal Co. account.....	2,510.00
Contingent liability at June 30, 1907, on drafts made against matte shipments.....	\$18,037.79
Bank of British North America:	
Payroll account.....	2,974.40
Imperial Bank, Cranbrook.....	100.00
	2,733,706.43
Sundry accounts payable.....	11,000.00
Balance to be expended under agreement with Canadian Metal Company.....	15,516.66
Payments on account of lead purchased.....	1,727.00
	50,210.71
Reserve for claims awaiting adjustment.....	2,000.00
Appropriation for Dividend No. 6:	
Payable August 1, 1907.....	4,000.00
Profit and loss account—	
Balance June 30, 1906.....	10,000.00
As per Statement for year ending June 30, 1907.....	20,000.00
	30,000.00
Less:	
Reserve for Dividend No. 3, paid Nov. 1, 1906.....	117,470.00
Dividend No. 4, paid Feb. 1, 1907.....	120,845.00
Dividend No. 5, paid May 1, 1907.....	120,845.00
Dividend No. 6, payable Aug. 1, 1907.....	4,000.00
	500,005.00

\$4,833,800.00
\$4,833,800.00

Assets.	
Mines, mineral claims, shares in other companies, etc.	\$3,326,685 05
Expenditure on Richmond-Eureka group	2,266 51
Options on mineral claims	15,438 18
Lease of Snowshoe mine	46,196 07
	<u>\$3,390,585 81</u>
Mining, smelting, concentrating, and refining plants:	
Balance at June 30, 1906	969,086 83
Add Construction account, June 30, 1906, to June 30, 1907	408,730 81
	<u>1,377,817 64</u>
Less:	
Sales of machinery	3,995 79
Depreciation	91,705 50
	<u>95,701 29</u>
	1,282,116 35
Smelter product on hand and in transit to refineries: Pig lead, bullion, matte, bluestone and antimony	466,176 20
Ores and metals on hand and in transit to smelter at June 30, 1907; at cost or less estimate for refining cost:	
Ores on hand at smelter	591,990 95
Ores in transit to smelter	11,947 80
Refinery metals on hand	479,841 34
	<u>1,083,780 09</u>
	1,549,956 29
Mine and smelter stores and materials	313,549 27
Sundry accounts receivable	115,309 18
Loan to Canadian Metal Company:	
Secured by first mortgage on assets:	
Disbursed to June 30, 1907	109,483 34
To be disbursed under agreement	15,516 66
	<u>125,000 00</u>
	240,309 18
Insurance and taxes paid in advance	23,918 35
Cash: Head Office, Toronto	6,215 59
Eastern Township's Bank, Phoenix	1,500 00
Bank of British North America, Kaslo	3,000 00
	<u>10,715 59</u>
	<u>\$6,811,150 84</u>

PROFIT AND LOSS ACCOUNT.

To Smelter product on hand June 30, 1906, and in transit from smelter to refiners	\$ 397,320 69
" Ore in transit to smelter, June 30, 1906, and in process of treatment	750,912 81
" Custom ore, lead and bullion purchased	2,384,180 80
" Freight on ore from company's mines	59,530 93
" Mining, smelting and general expenses:	
St. Eugene mines	389,832 59
Centre Star "	266,955 29
Snowshoe "	71,059 30
Trail smelter and refinery	934,883 83
	<u>1,662,731 01</u>
To Development expenses:	
St. Eugene mines	220,729 71
Centre Star "	297,473 52
Richmond Eureka mines	3,305 47
Snowshoe mines	9,870 58
	<u>531,379 28</u>
To Royalty on Snowshoe ore	53,230 81
" Depreciation: General plant and equipment	91,705 50
" Directors' fees	8,600 00
" Depreciation of stores, bad debts, etc.	3,685 47
" Balance, profit	484,676 07
	<u>\$6,427,953 37</u>

for refining cost, viz:

Ores in transit to smelter	11,947
Ores in transit to smelter	

Amount reserved at June 30, 1906, in excess of claims paid.

Amount reserved at June 30, 1906, in excess of claims paid.

Assets

Reserve: Held for claims of this company awaiting adjustment	(1000 00)
Dividend No. 3, paid Nov. 1, 1906	1000 00
No. 4, paid Feb. 1, 1907	1000 00
No. 5, paid May 1, 1907	2500 00
No. 6, payable Aug. 1, 1907	1000 00
Balance carried down	5555 00
	\$ 5555 00
Balance brought down	\$ 5555 00
	\$ 5555 00

MANAGING DIRECTOR'S REPORT.

"I beg to submit the results of the Consolidated Company's operations for the year ending June 30, 1907, including balance sheet, profit and loss account, production, and general report, with maps and photographs showing the groups of claims controlled and operated by the Consolidated Company, and vertical projections of the principal producing properties.

"Financial Statement.

"After writing off \$91,705.50 depreciation upon plant and equipment, the operating profit shown is \$484,676.07. The special reserve of \$20,000 provided for June 30, 1906, has been used in settling claims for damages resulting from the explosion of the powder thaw-house at the Centre Star mine. A new reserve fund of \$20,000 for claims on other accounts has been established. After providing for the above and the payment of four dividends, numbered 3 to 6 inclusive, amounting to \$480,005, the balance at the credit of profit and loss account is \$55,586. In determining the values of the metals and products on hand, quotations lower than the market prices of June 30, 1907, have been used, in order to provide against declines in the metal markets.

"The profits of the company for the year have been unfavourably affected by two strikes in the coal fields, which shut off the fuel supply for the mines and smelters; the very severe winter of 1906 and 1907, and the unsettled and unsatisfactory labour conditions, all of which greatly restricted the mining, smelting and refining operations, and resulted in increased costs as compared to the previous years. As an illustration of the effect of the above-mentioned adverse conditions, the tonnage mined in Rossland

and smelted at Trail for the year only slightly exceeded the tonnage mined and smelted during the six months ending June 30, 1906.

"In place of disposing of treasure, we have cash with which to purchase new properties and to pay for new construction equipment and improvements, a portion of the company's working capital has been used. Treasury stock was also issued in part payment for some of the properties acquired.

"Due to unavoidable circumstances, the stock of ores, by-products, and metals on hand June 30, 1907, was very large. Indications are that smelter and refinery supplies will be delivered with greater regularity, and that this large stock will be reduced before the first of the year.

"The Snowshoe overdraft guaranteed by the Consolidated Company, amounted June 30, 1907, to \$46,196.07.

"The Consolidated Company have advanced the Canadian Metal Company \$100,000, and have agreed to advance a total of \$125,000, which is secured by a first mortgage upon the Blue Bell mine and Frank zinc smelter.

"Production.

"Following are the productions of the Atlantic Group, controlled and operated by the Canadian Metal and Snowshoe Companies of Canada, Limited, for the year ending June 30, 1907, and the total production to date, as far as can be ascertained. It will be noted that the production of metal sold by the company is resulting from the loss of the Snowshoe mine and the Frank zinc smelter, the total value of the production being \$4,780,141, of which \$9,000,000 came from the company's own properties:

"Year Ending June 30, 1907.

	Tons Ore.	Oz. Gold.	Oz. Silver.	Lb. Lead.	Lb. Copper.	Total value
Centre Star and War Eagle	81,788	32,306	27,808	.....	1,030,529	\$ 893,249
St. Eugene, ore.....	127,645	.....	675,959	29,391,389	.....	1,713,933
" concentrates..	24,737	.....	.....	.....	.....	.....
Snowshoe	49,002	2,989	16,171	.....	1,372,056	397,141
Trail smelter (smelted)...	222,573	69,168	1,100,271	20,383,083	3,443,310	3,786,146
"Total Production Since Commencement of Operations in 1894.						
	Tons Ore.	Oz. Gold.	Oz. Silver.	Lb. Lead.	Lb. Copper.	Total value
Centre Star and War Eagle	924,472	489,188	687,902	.....	21,083,914	\$13,724,282
St. Eugene, ore.....	525,127	.....	.....	.....	.....	.....
" concentrates..	113,668	.....	3,358,232	134,851,109	.....	6,203,276
Snowshoe	141,332	11,391	42,946	.....	3,772,636	1,203,141
Trail smelter (smelted)...	1,291,186	578,142	10,179,104	102,671,523	28,836,756	25,800,231

NOTE—Trail smelter production does not cover period the smelter was operated by the British Columbia Smelting and Refining Company, which was previous to March, 1898.

"Development.

"There are about 16 miles of underground development or narrow work in the Centre Star and War Eagle group, and about 10 miles in the St. Eugene. During the year the following development work has been driven in the three principal producing properties:

	Centre Star.	War Eagle.	St. Eugene.
Drifting	4,186.5	2,599.5	9,486
Cross-cutting	1,526	1,298.5	1,610
Raising	811	574	2,417
Sinking	337.5	131.5	339
	6,861	4,603.5	13,852
Diamond drilling ...	6,287.8	1,749.4	4,697

"In the Centre Star a large tonnage has been developed in the east ore bodies above the 5th level. The 11th level has developed in a most encouraging manner, there having been found six ore shoots, the largest having a width approaching 40 ft. Several of these have yielded ore of a considerably better grade than the average mine-run from the Centre Star group. The east ore shoot which started at the 6th level was found to be of greater length on the 11th level than at first supposed, and although it is not wide, yet it is of excellent grade. Three ore shoots west of the shaft have turned out satisfactorily. The 12th level has been extended the full length of the property, and only two pay ore bodies have as yet been located, one being the continuation of the main east ore shoot, which was small but in places contained very high values. There is still a large amount of cross-cutting to be done upon this level, and there are a number of places where sufficient values have been found to justify starting raises. The main Centre Star shaft is down below the 14th level, and stations have been cut on the 13th and 14th levels and cross-cutting for the vein started.

"A fair tonnage of ore is being found in the upper levels of the War Eagle, particularly around the 4th,

5th and 6th levels, where in some cases the ore bodies had faulted. In the lower workings, the chief feature has been the development between the 10th and 12th levels, where a tonnage of high-grade silicious ore is being developed. A small shoot of heavy sulphide carrying high copper values has also been found. There still remains a large area of country to prospect between the 8th and 12th levels, as the old War Eagle drifts below the 8th level were run in the foot-wall of the vein.

"Nearly all of the shipments from the Iron Mask have come from new ore, the old ore reserves, which had been developed at the time of purchase, not having yet been materially drawn upon. The Iron Mask ore bodies are for the most part small, but in cases, quite long and yield a good grade of ore. There are fair prospects of continuations of the old veins being found, and a possibility of new ones located.

"On the Idaho property, which has recently been acquired, a vein about 30 ft. wide has been discovered near the middle of the claim. A small prospecting shaft is being sunk, and at the start yielded fair values, but recently has been in a fault, since which time the values have been low. The 4th, 7th, 8th and 12th Centre Star levels have been extended into the Idaho ground. A large part of the distance driven was through the large dyke which forms the Centre Star gulch. The assays in the lower levels have been somewhat discouraging, but on the 4th level there are good prospects of locating ore bodies containing pay values. At several points mineralized ground was encountered, which will require more thorough prospecting.

"Development at the Snowshoe has been satisfactory. The main increase in ore reserves since leasing the property has been due to the opening up of the Gold Drop branch ore vein. Diamond drilling below the main fault has not located any ore.

"At the St. Eugene mine, Moyie, large ore bodies in the cross veins have been found. These are known as 3rd and 4th avenues. The 3rd avenue ore shoot, found by diamond drilling, has been located on the

1,700, 1,800, 1,900 and 2,000 ft. levels. The 2,000-ft. level does not promise to yield large tonnage as did the 1,900 ft. level, but the level was thoroughly prospected. In the south vein, just above the 2,000 ft. level, an ore shoot 30 ft. thick of high grade of ore has been found. The 2,100-ft. level has not shown up any large ore bodies, but it will require some months to prospect. There are indications that the south vein may in the future prove to be more productive than the main vein, and there is every reason to hope that other cross fissures containing ore will be found.

"The Richmond-Eureka group at Sandon promises to yield a small tonnage of high-grade ore. Tunnels Nos. 2, 3, 4 and 5 have been driven, and in cases small rich ore bodies located. One carload of ore encountered in development was shipped which yielded \$3,305.47, and there is more ore on the dump. Before other shipments are made an aerial tramway will be built.

"The ore reserves in Rossland have been materially increased since the last report, while the developed tonnage at the St. Eugene is about the same as that of June 30, 1906. The probable Snowshoe tonnage has been increased.

"At Rossland, all the underground workings between the Centre Star, War Eagle and Iron Mask have been connected by the driving of several long cross-cuts on the different levels, in order that all of the ore from these properties might be handled through the main Centre Star shaft. All this work has been charged off to development account. Electric haulage has been installed on the 350, 4th and 9th levels, the 350 and 9th being for the handling of all War Eagle and Iron Mask ore below the second level.

"All costs of development in the company's producing mines, amounting to \$531,379.28, have been charged against profits.

"Construction and Improvements.

"During the year a large amount of new construction and improvements at the various properties was completed or nearly completed, the amount expended upon this account having been \$408,730.81. The main items have been as follows:

"At Rossland mines, the enlargement of the Centre Star compressor plant, and the purchase of an electric motor for driving the old Centre Star compressor (to replace steam); a Nordberg hoist (with new head works) for handling the ore from the Centre Star, War Eagle, Iron Mask and Idaho mines; an ore conveyor, sorting and complete sampling plant; electric haulage on several levels underground and on the surface; additional fire and water systems; additional equipment for shops.

"At the St. Eugene, numerous improvements and additions to the concentrating mill; additional fire protection; additional machinery for shops; improvements in power plant and boiler house; improvements to hoisting plant.

"At the Snowshoe, additional fire and water systems; installation of electric haulage; new compressor

plant; other improvements and equipment for shops; additional buildings.

"At Trail, enlargement of upper furnace and boiler house; installation of the Henderson Hoist; new plant consisting of compressors, mill fans and trestles; additional electric locomotives and electric cables; new room in the engine house; new building of the acid plant; the additions of an anti-mony plant.

"New Properties.

"During the year the Iron Mask property at Rossland, referred to in the previous report, was purchased for cash.

"On account of the agreement entered into by the eastern part of the Centre Star mine, next the Idaho claim, the surface showing, which indicated a continuation of the main Le Roi Centre Star vein through the Idaho claim, and because of the cheapness with which this property could be developed from the various Centre Star levels which had been driven to the Idaho line, the Consolidated Company acquired the Idaho claim for part cash and part shares in the Consolidated Company.

"As the main Le Roi Centre Star vein can be traced through not only the Idaho claim, but also through the Enterprise property, joining the Idaho on the east end line, it was decided to purchase this property for cash. This gives the Consolidated Company 4,500 ft. on the main Le Roi Centre Star vein.

"In view of the recent favourable developments on the Snowshoe, Gold Drop and Rawhide properties, all in Phoenix camp, it was considered advisable to purchase, partly for cash and partly for shares of the Consolidated Company, the Phoenix Amalgamated Company's properties, and negotiations for the acquisition of these interests were completed June 30, since which time the actual purchase has been made. The Phoenix Amalgamated Company's properties comprise the following claims: War Eagle, Missing Link Number 2, Dandy, Bald Eagle, Pin Hook, Red Rock, Lulu and some fractions, the total acreage being about 210.3. These properties adjoin the Greyhound Consolidated Company's properties upon the south.

"Negotiations were also completed June 30 for the purchase of the Four Ace and Keystone properties, adjoining the Phoenix Amalgamated Group on the south. Several options have been taken on other properties near Phoenix.

"To provide a sufficient supply of lead ore for the furnaces and refinery at Trail and to insure a sufficient lead tonnage to enable the company to maintain its strong position in the Canadian, Chinese, and Japanese lead markets, an agreement was made with the Canadian Metal Company, by which the Consolidated Company is to advance \$1,750,000 for development and the construction of a lead concentrator at the Blue Bell mine (which also will be secured by mortgage upon the Blue Bell mine and concentrator and Frank zinc smelter), and in consideration of the advance the Consolidated Company has secured the

Canadian Metal Company's entire output of lead and zinc concentrates for a period of years.

"Management and Staff.

"The excellent condition of the company's mines is largely due to their manager, Mr. R. H. Stewart, and the favourable results, considering the adverse conditions previously referred to, are due to Messrs. Jules Labarthe, manager of the Trail smelter and refinery; T. W. Bingay, comptroller; William Chambers, superintendent of the smelter; John F. Miller, superintendent of the refinery; A. J. McNab, metallurgist; R. Purcell, superintendent of Rossland mines; W. P. White, superintendent of St. Eugene mines; Charles Biesel, superintendent of Phoenix mines; and John M. Turnbull, mining engineer."

DE LAVAL'S ZINC PROCESS.

A ZINC PROCESS stated to be effective in the treatment of zinc and iron ores of low grade was referred to by the Stockholm correspondent of the *London Mining Journal* a few weeks ago in the following terms:

For some time important experiments have been conducted at the Sala zinc and silver mines in central Sweden, with the object of extracting zinc from zinc tailings by means of Dr. De Laval's well-known electric (so-called cyclon) furnaces. The experiments have been conducted at Sala, as this mine contains an enormous quantity of zinc tailings, the accumulation of several hundreds of years' mining. The more recent experiments here have proved a decided success. The oxide of zinc, obtained from the tailings, contains about 15 to 20 per cent. of zinc, which is considered a very good result for a beginning.

As regards the commercial side of the new process, it is yet too early to give any definite information, since the experiments made at the Sala mines have, up to the present, been of a purely tentative and not of a commercial nature. But as far as one is able to judge from the product obtained from the cyclon furnaces (viz., the zinc oxide), this new process promises good results. It is also expected that it will ultimately be profitable, as soon as it comes into general use. Now that the initial experiments have proved so satisfactory, all that is needed is to organize the work on a large scale, so that it may be of practical and commercial utility.

The "Svenska Dagbladet," in an article on Sweden's foreign trade, writes: "A metal of great importance for Sweden's foreign trade is zinc. Hitherto our export in this direction has principally consisted of Ammesby roasted zinc blende and of ore from the Rylls Wytlang zinc mines, but it seems as if we are on the threshold of an important new departure. Should the experiments now being carried on on a large scale at Sala, with the help of De Laval's so-called 'cyclon furnaces,' prove to be a definite success, a large proportion of Sweden's now

worthless or useless zinc ores will, with certainty, in a short time be extracted in the country itself—thanks to which our annual export will be increased by several millions crowns."

It thus seems that—thanks to the genius of De Laval and other scientists—in this direction, the hitherto worthless and low grade zinc and iron ores of Sweden, Norway, and other countries, will soon become of great value in the mining industry.

An advantageous arrangement of rails and rail joints is thus described in an English trade journal: When laying underground tramroad or railway it is exceedingly difficult in the semi-darkness of the mine, with the ordinary bridge rail laid on the sleepers with a butt joint, to secure its proper alignment, and considerable care has to be exercised in getting an even joint, which is necessary if a tub is to run over it without any chance of its being derailed. It frequently happens that the nails split the sleeper, allowing a rail to get loose and out of place, and the adjacent rail, remaining rigid, produces a projection against the wheels of the trams or tubs as they pass along, causing them to get off the rails and dislocate the traffic until the defect has been remedied. To prevent this derailment, by constructing the rails at their ends in such a manner as will prevent one rail moving from its adjacent rail, has been accomplished in several ways, one being as follows: A piece of the arch or top of one end of a bridge rail is cut out so as to form a groove or a gap about one inch long and one-half inch wide, vertically down through the arched portion of the bridge. The opposite end of the rail has a projection formed by cutting away a portion of its end side flanges and welding or squeezing together by suitable means the remaining portion of its side ends to form such projection. When placed in position the projection or tongue of one rail fits in the groove of its adjacent rail, thus forming a smooth and almost rigid joint. A great advantage is that one nail in each rail will suffice instead of two in the ordinary method, each rail receiving the benefit of the nail in its adjacent rail. A further point to be considered is the preservation of sleepers, for by this method they may be used several times, while under the ordinary system it seldom occurs that a sleeper which has had four nails driven in each of its ends and taken out if of any use for relaying.

In Western Australia a new agreement entered into between the Miners' Union and the Chamber of Mines provides for a renewal of the old agreement for another two years from date of expiry, with an increase in the minimum rate of pay for underground work from 10s. to 11s. per shift, the union giving a guarantee of industrial peace during the period mentioned.

It is stated that deposits of gypsum at Grand Prairie, in Kamloops District, are to be developed.

COMPANY CABLES AND NOTES

Le Roi No. 2—November: Shipped 101 tons concentrates during the month, \$8,250. (Office note—Mr. W. A. Carlyle of 62, London-Wall, E.C., has been appointed consulting engineer to the company. Mr. Carlyle was until recently general manager of the Rio Tinto Mining Company, prior to which he was resident engineer at Rossland of the Le Roi mine.)

Ytee—November: Smelted in 24 days, 115 tons of Ytee ore (value after deducting refining charges, \$1,586), and 5,273 tons of custom ore—5,388 tons, producing a total of 478 tons of matte.

Le Roi No. 2—November: Vancouver mine report—Shipped 120 tons. The net receipts are \$7,814, being payment of 80 per cent. for 101 tons concentrates shipped.

Ytee—November: Smelted in 24 days, 115 tons of Ytee ore (value after deducting refining charges, \$1,586), and 5,273 tons of custom ore—5,388 tons, producing a total of 478 tons of matte.

U. S. A.—

Alaska Consolidated—November: 50-stamp mill ran 349 hours and crushed 3,200 tons of ore for 555 oz. of gold, valued at \$8,700. Saved by amalgamation and concentrates, valued at \$1,800. Total, 3,200 tons of ore for \$10,500. Amount recovered per ton, \$3.28. Assay value of tailings, \$0.28. No. 3 east drift from Alexander tunnel advanced 62 ft. and cross-cut 30 ft. No. 3 west drift from Alexander tunnel 53 ft. No. 4 west drift from Alexander tunnel advanced 70 ft. and intermediate level 20 ft.

Alaska Mexican—November: 120-stamp mill ran 30½ days, crushed 20,818 tons ore; estimated realizable value of bullion, \$31,610. Saved 275 tons sulphurets; estimated realizable value, \$18,725. Working expenses, \$25,460.

Alaska Treadwell—November: 240-stamp mill ran 30½ days, 300-stamp mill ran 30½ days, crushed 85,326 tons ore; estimated realizable value of bullion, \$88,509. Saved 1,610 tons sulphurets; estimated realizable value, \$75,951. Working expenses, \$84,267.

Alaska United—November: Ready Bullion Claim: 120-stamp mill ran 30 days, crushed 19,800 tons ore; estimated realizable value of bullion, \$24,889. Saved 300 tons sulphurets; estimated realizable value, \$10,635. Working expenses, \$27,191.

NOTES.

At a meeting of directors of the Granby Consolidated Mining, Smelting and Power Company, Limited, held in New York early in December, it was decided to postpone declaration of the dividend which, had the company's mines and smelting works been in operation, would have been declared.

At a meeting of the Alberta Railway and Irrigation Company (which owns and operates coal mines at Lethbridge, Alberta), held in London, England, on November 7, the chairman said that the position of the company was satisfactory and he hoped its common shares would be placed on a dividend paying basis in 1908.

The Supreme Court has ordered the winding up of the Metropolitan Gold and Silver Mining Company, of Lardeau, B.C., Limited, and has constituted Edward Blake McDermid of Nelson, accountant, official liquidator. The liabilities of the company, which has been operating the Triune mine, situated about ten miles from Ferguson, are stated to be about \$160,000.

The adjourned meeting of the Revelstoke & McCullough Creek Hydraulic Mining Company took place at Revelstoke on December 12. The balance sheet for the past year was submitted and the election of officers for the ensuing year took place. The officers are Chas. F. Lindmark, president;

Morris Thomas, W. J. Bates, Duluth, Minn., and Gus Carlson, Hildburg, Minn., directors.

COMPANIES INCORPORATED

Capital of \$100,000, divided into 100,000 shares of \$1 each

capital of \$100,000, divided into 100,000 shares of \$1 each

Creek, near Bear River, Portland Canal district of Skeena mining division.

\$250,000, divided into 2,500 shares of \$100 each

capital of \$15,000, in 15,000 shares of \$1 each

REGISTRATION OF EXTRA-PROVINCIAL COMPANY

Spokane, Washington, U.S.A. Capital, \$100,000, divided into 1,000,000 shares of ten cents each. Head office in British Columbia at Victoria. Attorneys, (not empowered to transfer and issue stock) Alexander Scott James, barrister, Victoria.

COMPANY REGISTERED IN ENGLAND

C. Godfray, 42 Finsbury Square, E.C. Capital £50,000, in 5s. shares. Objects: To acquire the business of the Ymir Gold Mines, Limited (in voluntary liquidation), and to carry on the business of gold, silver, and general miners, etc. No initial public issue. The first directors (to number not less than three nor more than nine) are to be appointed by the signatories. Qualification, £150. Remuneration, £600 per annum and 5 per cent. of the dividends in excess of 10 per cent., divisible. Registered office: 6 Laurence Pountney Hill, E.C.

TRADE NOTES AND CATALOGUES

Mussens Limited, of Montreal, Quebec, sole Canadian agents for Fraser & Chalmers, Limited, the well known British machinery manufacturers, have received a supply of the latter company's new catalogues, any of which they will be pleased to send to those applying for same. The list comprises the following:

- A—7. Rateau Patent Steam Turbine
- C—5. Whitmore Patent Governor for Air Compressors and Pumps
- D—7. Parnell Steam Stamp
- D—10. Two Stamp Mills
- D—11. The Nelson Patent Automatic Feeder
- D—12. Bremme's Patent Rapid Discharge Mortar Box.

- E—6. Evans-Waddell Chuban Mill
- F—3. Picking Belts and Tables
- F—14. The Calfow Screen
- G—1. Copper Smelting Furnaces

- M—11. Gold Collecting Tables (Turners' Patent)

Liquids, especially useful for pump, dam and engine tests.

- N—9. Mr. Walter McDermott's Notes on Screening and Concentration

The Jeffrey Manufacturing Company, of Columbus, Ohio, U.S.A., have sent an illustrated bulletin descriptive of the Jeffrey Centrifugal Fan for mine ventilation. This fan is of the highest efficiency and best mechanical construction; it develops large volumes at low speeds, large capacity against high gauges. For testing and show purposes, the company has installed at its works at Columbus a complete 10x5-ft. fan, and with this tests are made for interested parties.

A timely publication is the booklet issued by the Canadian Westinghouse Company, Limited, of Hamilton, Ontario, describing the Westinghouse Pipe-Thawing Apparatus. The text deals with outfits for two classes of service—light service such as thawing out the pipes of a dwelling house, and heavy service such as thawing out large underground mains. Other publications received from this company are the following circulars: No. 1097, Westinghouse Types K and KG Motors, direct-current series wound for use on cranes, hoisting machinery and similar service; No. 1107, Westinghouse Automatic Circuit Breakers, carbon break; No. 1147, Westinghouse Relays for alternating and direct-current service.

Peacock Brothers, engineers, of Montreal, Quebec, who are sole Canadian representatives of Hathorn, Davey & Company, Limited, of Leeds, England, are inviting the attention of Canadian buyers to the especial merits of the Hathorn-Davey pumping machinery for waterworks and mines. In their publications appears one striking illustration showing three sets of geared three-throw horizontal ram pumps, 9 rams each 10 in. diameter by 20 in. stroke, while another illustrates the triple expansion engines of the Leeds Waterworks, the official trial of which indicated steam per pump horse-power per hour 13.051 lb. and per indicated horse-power per hour 11.91 lb., with a mechanical efficiency of 91 per cent.

BOOK REVIEWED.

Mining, Mineral and Geological Law of the United States.

By Charles H. Shamel, Pp. 627; illustrated, 6x9 in.; cloth, \$5. New York, 1907; Hill Publishing Company.

Contents: Geology and allied sciences—definitions. Property in minerals. Legal definitions of mineral and ore. Theories of ore formation and classification. Right of extralateral pursuit of vein. Public domain and mining laws applying. Acquisition of mining rights. Scientific definition of vein, etc. Legal definition of vein or lode. Legal definitions of apex, strike, dip, etc. Extralateral rights. Tunnels, etc. Discussion of proposed repeal of extralateral law. Placers. Water. Miscellaneous uses of geology in law. Forms and procedure for locating mining claims. Forms and procedures for obtaining patents. Appendix. Bibliography. Classification of rocks and geological formations.

Reviewing this book for the *Engineering and Mining Journal*, Dr. R. W. Raymond, who is eminently fitted to pass judgment upon such a work as the one under notice, bears testimony to the fact that the views of the author are "clearly, forcibly and courteously expressed, and constitute a timely contribution to the discussion of a question by no means yet out of date." Dr. Raymond says, in part:

"1. The author disclaims the purpose of supplanting by this treatise either, on the one hand, the classical works on the U. S. mining law, which will remain indispensable to lawyers, or, on the other hand, the books and monographs on geology and ore deposits, which will remain indispensable to experts in those departments of science; but he thinks there is room between these two classes for a useful book, which will enlighten the intelligent layman, interested in mining, as to the legal relations of that industry, and the geological

conditions which (as I think, unnecessarily and most unfortunately), profoundly affect those relations in certain parts of the United States, though nowhere else in the civilized world. In his perception of the probable usefulness of such a book, he may be right; but I cannot help feeling that he has missed the opportunity of supplying a much more pressing general need. For the mining law which he expounds is mainly (apart from certain incidental items, which I will not here stop to enumerate), not mining law at all, but simply the system regulating the disposal of public mineral lands by the United States and the subordinate conditions imposed upon holders of possessory title by the several States and Territories included in the region to which the U. S. law applies. Now, the immensely greater part of our mining industry is carried on in States wholly outside of the region favoured (or cursed) with the U. S. law of mining titles. In all those States, there are real mining laws, *i.e.*, laws governing the operating of mining, apart from the conditions of mining titles. A summary of these statutes which have been much more useful, and would have appealed to a much larger constituency, than any abridged re-statement of the U. S. law for the sale of mineral lands, which entirely ignores the actual subsequent operations of the purchaser.

"2. The method by which the author proposes to carry out his own conception is to give a summary outline of geological theories, and a summary statement of legal principles, legislative enactments, and judicial decisions, to which are added, *passim*, historical and critical comments of his own, which belong in an entirely different class, since they constitute, not declarations of existing science or law, offered for the guidance of the reader, but arguments and explanations which, however suggestive or weighty, cannot be deemed authoritative. It seems to me that nobody can be misled by the intercalated individual opinions of the author, and therefore that they do not impair the practical value of his work. Consequently, I accept his method as entirely legitimate, and worthy of such candid praise as the manner of its execution may deserve.

"3. In the performance of his design, so far as the department of geology is concerned, the author has done about as well as anybody could be expected to do. Geological facts and theories ought not to be involved in the title to real estate; they are not thus involved, outside of certain regions in this country; the U. S. law for the sale of mineral land in those particular regions was framed in total ignorance of geological science as it now exists; nobody can state that science today so as to make it fit the terms of that law; and statement of it, as a mere auxiliary portion of a manual of U. S. mining law, is likely to take up more room than it is worth, and possibly to do harm by giving the reader that 'little knowledge' which is 'a dangerous thing,' especially as it leads him to feel that it is all he needs to know. Dr. Shamel has guarded against this mischievous result by abundant references to technical literature; and his outline of the subject, though necessarily sketchy, and perhaps somewhat uncritical, is intelligent and suggestive.

"The same may be said of his statement of the law, as expressed in the U. S. Rev. statutes, together with their judicial exposition down to the present date. His statements under this head are always intelligent, generally correct, and very seldom open to hostile criticism from a legal standpoint; and, since he furnishes, for the use of those readers who desire more detailed guidance, ample references to classic authorities and official reports, I do not see how his book can be otherwise than instructive and suggestive, even to those whom it may only stimulate to further research.

"In the third department of the treatment of his subject, namely, that of historical review and critical argument, and especially the author's defence of the 'extralateral right,' as a feature of the 'law of the apex,' statements and opinions are advanced with which I cannot concur, and important facts and conditions are ignored, which, in my judgment ought to be taken into consideration. * * *

CANADIAN MINING INSTITUTE

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William Anderson

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MINING MEN AND AFFAIRS.

J. McLellan, formerly resident in the Lardeau district, was in Victoria in December.

Frank B. Smith, of Edmonton, Alberta, lately paid another visit to Victoria.

Louis Pratt, of Sandon; A. D. Wheeler, of Ainsworth; and W. E. Zwicky, of Kaslo, were in Spokane in December.

W. R. Rust, general manager of the smelter at Tacoma, Washington, has gone to Europe on a three months' visit.

W. J. Elmendorf lately left Whitehorse, Yukon Territory, for his home in Spokane, Washington, where he is spending the winter.

John M. Harris, of the Star and Reco mining companies, returned to the Slocan from Spokane about the end of December.

Robert Smart, Dominion Government assayer at Whitehorse, Yukon Territory, was a visitor to Seattle, Washington, about the close of the year.

John F. Miller, of Trail, superintendent of the Consolidated Mining and Smelting Company's lead refinery, was a visitor to Spokane in December.

J. A. Whittier, manager of the Goodenough mine, Slocan, has suspended work on that property for the winter, which he is spending at Nelson.

G. O. Buchanan, of Kaslo, is again kept busy in connection with the payment of the bounty on lead, the fall in the market price having again brought the Bounty Act into operation.

Bruce White, of Nelson, left that city about the middle of December for one of the Queen Charlotte Islands, to there examine some mineral claims for United States capitalists.

J. F. Silverman, of Frank, Alberta, vice-president of the Canadian-American Coal and Coke Company, went to Great Falls, Montana, early in December on a visit.

Mining Science, of Denver, Colorado, U.S.A., says: "Geo. H. Barnhart, of Nelson, B.C., is in charge of operations for the Torpedo-Eclipse Mining Company, Ouray, Colorado."

George Leyson, one of the pioneers of the Boundary district, and in 1906 superintendent of the Silver Queen mine, Cobalt, Ontario, lately took charge of the Cobalt Contact property as manager.

E. E. Reynolds, formerly manager of the International Coal and Coke Company's colliery at Coleman, Alberta, and now manager for the Diamond Company at Lethbridge, was in Frank recently.

R. H. Stewart, of Rossland, manager of the mines of the Consolidated Mining and Smelting Company of Canada, has gone east to be married. He planned to visit Europe with his bride before returning to Rossland.

Robert R. Hedley has been visiting the coal mining districts of Alberta, prior to proceeding to Ottawa to prepare for publication the mass of mining information he obtained in the West.

R. P. Butchart, manager of the Vancouver Portland Cement Company, left Victoria recently on a trip East. He will visit New York and go thence to Mexico before returning to Victoria.

Neil McL. Curran, manager of the North Star mine at Kimberley, East Kootenay, left for the East on December 10.

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Before returning he will probably spend several weeks with

Spokane. Frederic Keffer, the company's engineer and geologist, about the same time made a trip to the Similkameen district.

Oleott Payne, manager of the Hewitt Mining Company, has returned from New York. While in the East he made arrangements for the supply of an air compressor for the Hewitt mine, near Silverton, Sloan Lake, and an electric generator for the mill on Four-mile Creek.

Certificates of efficiency as assayers have been issued by the provincial minister of mines to Arnold S. Langley, Leigh Richmond, Stuart S. McDiarmid, and Allan B. Ritchie, all of whom passed the examination for assays held at Victoria on December 2 and following days.

Ernest Mills, formerly of Greenwood, in the Boundary district of British Columbia, where he was an active worker for the Western Federation of Miners, has been appointed secretary of that body in the place of James R. Kirwan, who resigned owing to ill health.

Andrew Colville, who lately resigned the position of superintendent of the Crow's Nest Pass Coal Company's Coal Creek colliery, was given a valedictory smoking concert and presented with a gold watch and other valuable gifts by the miners and others at Coal Creek before he left for the East.

E. Stables, of London, has left British Columbia on his return to England. For several months, until a recent suspension of work, he had charge of the Lenora mine at Mt Sicker, Vancouver Island, for the Vancouver Copper Company, of London.

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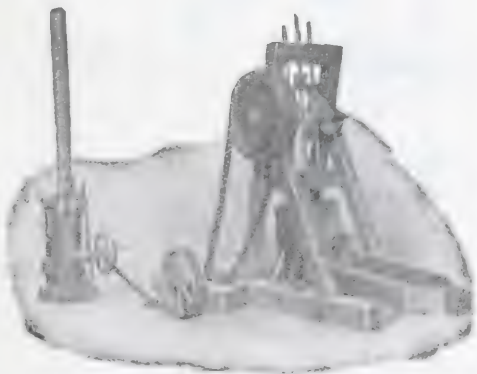
obtaining at the former city.

he shall find it desirable to i

occurrences on Vancouver Island and at other places on the coast which he has examined during the last six months.

charge of the Sullivan lead smelter at Marysville, B.C., was presented by the employees of the Northport smelter, of which he recently resigned the management, with a handsome diamond-set watch charm. The present was made by John Barnes, who, on behalf of the employees, expressed appreciation of the harmonious relations which long existed between the manager and men. Mrs. Barnes was also the recipient of a useful present, also from the employees.

Northport works, having arranged to go to Marysville with Mr. Goodell, was presented by his fellow workmen with a hunting case gold watch, suitably engraved. Mr. Barrett was shift boss and foreman at Northport for about six years.



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(2) If the father (or mother, if the father is deceased), of the homesteader resides upon a farm in the vicinity of the land entered for, the requirements as to residence may be satisfied by such person residing with the father or mother.

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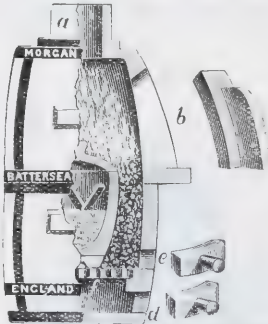
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